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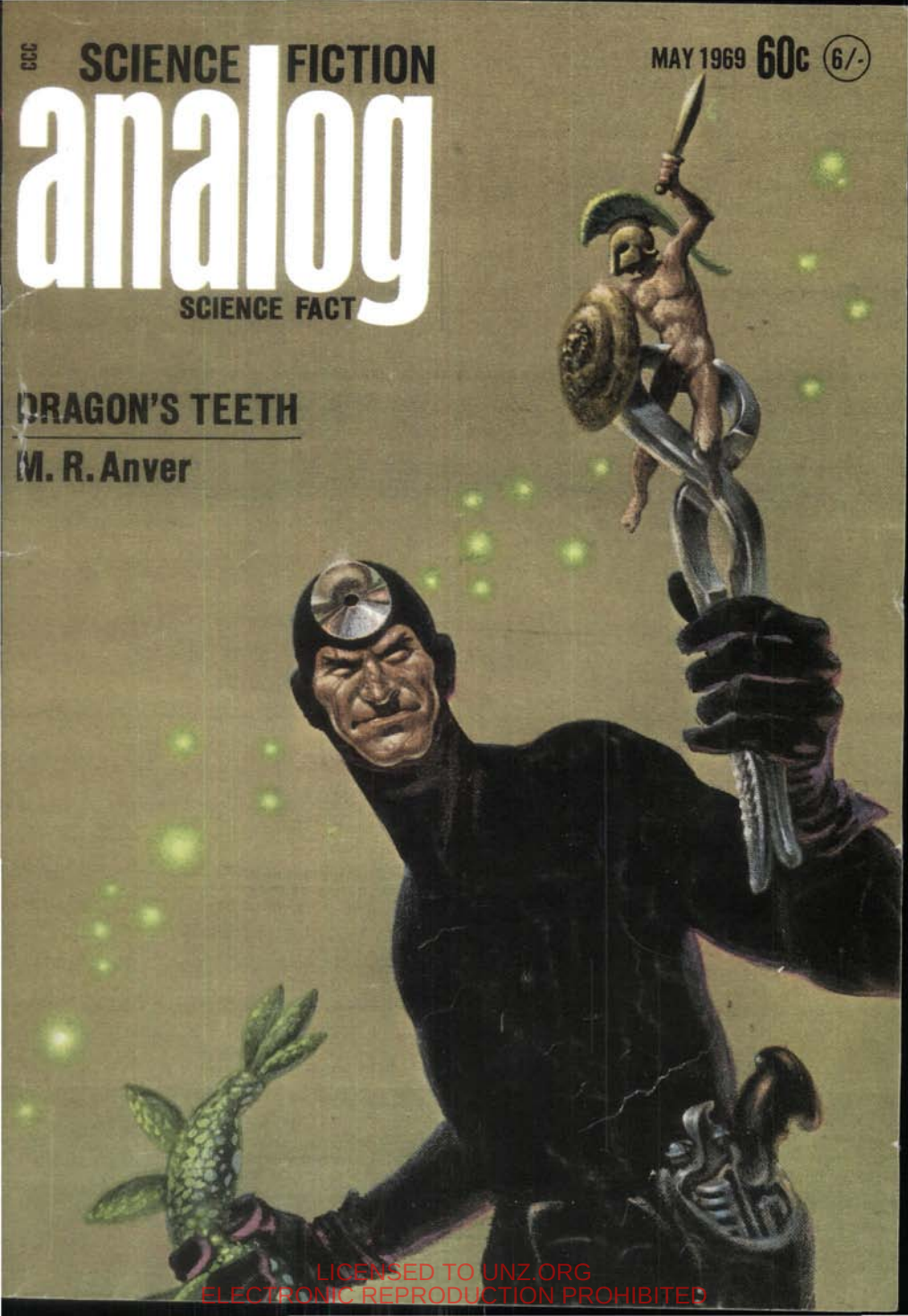
DRAGON'S TEETH

M. R. Anver



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FACE AGAINST PEACE

an editorial by
John W. Campbell

There's been a lot of wild demonstrations and howls of protest about "End The War" for several years now. All of these humanitarians (some of whom moved hastily to Canada to escape the draft) have been amazingly sure the problem was easy—that all we had to do was surrender, withdraw, and Let Peace Reign.

As a member of the Establishment—that's why so many professional organizations are incensed by my editorials—I, of course, don't appreciate how simple that whole thing really is.

The young, clear-sighted, understanding antiwar demonstrators know that it's only the United States's presence that causes all that murder, terrorism, and fighting.

That, of course, is why it's been going on continuously for some twenty-five years. Actually, it would have gone on longer, for some thirty years, except that thirty years ago the Japanese, then a fully Oriental culture themselves, were in the area and acting like Orientals. Even Ho Chi Minh & Co. had more sense than to try terrorism against an Oriental army.

Several non-western and non-obvious ideas are essential to understanding the situation.

1. The Vietnamese—both North and South—are an Oriental people, with basically Oriental standards of value and philosophy. I.e., they do not think, and evaluate, as we do.

2. In the Oriental scheme of things, Face is far more important than Life—Status outweighs Reality. During WWII many a Japanese officer who did his best under impossible conditions and lost the hopeless battle committed hara-kiri because of loss of Face.

3. During WWII, the Japanese made no effort whatever to save downed airmen; they lost most of their skilled pilots and bomber crews in the attacks on Guadalcanal because the range the planes had to fly was too great for the planes to make it home, and the men were lost at sea.

A few patrol planes and/or boats could have saved many of the men, in perfect safety, because the range was beyond anything our planes from Henderson Field could have achieved.

Japanese sailors in the sea from sunken Japanese warships fought

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against rescue by American ships, actively seeking to die.

4. In the Oriental scheme of things, pure, sheer terrorist tactics are not a surprising method of attack—they're the natural, obvious, sensible way of doing things.

5. The basic underlying philosophy is that *only a hero's life is of any value whatever.* The defeated soldier, airman or sailor is of no value; only the hero who wins and returns successfully is of value. If you didn't win—you should drop dead.

And, of course, anyone who doesn't do what you demand is of no value; he should be killed and removed as expeditiously as possible, with a minimum of fuss.

These concepts we can most directly appreciate through study of WWII Japanese tactics, because the full documented records of both sides are available. The essential philosophy is common in much of the Orient. There are too many people around anyway—the slaughter of a few millions might relieve the pressures there. So why value individual lives?

Now let us apply these ideas to the simple business of ending the Vietnam War, as all the loudmouthed humanitarians demand, by simply withdrawing all our support from the South Vietnamese.

North Vietnam, with Chinese and Russian supplies in quantity—a winning side has less trouble getting equipment—moves in immediately. With the Oriental philosophy compounding the Communist philosophy which has, itself, been noted for a ruthless attitude toward opposition.

Within a period of weeks, there would be complete peace in Vietnam; we wouldn't hear a thing out of the country, except expressions of relief, happiness, and brotherhood.

The ones who had opposed the Communist forces would not, of course, be alive enough to complain. When Chairman Mao and Co. moved into China and drove out Chiang Kai-shek after WWII, they did something millennia of conquerors had been unable to do.

Previous would-be rulers of China had run into the ancient, stabilizing system of the Ten Elders in each village. The villages were run by the Ten Elders—a sort of local Supreme Court of ten old men. The system was self-perpetuating, and thoroughly conservative; if one, two, or all of the Ten Elders died—automatically the next ten eldest became the Ten Elders.

The Communists announced what the village was to do, and told them who was running it—and the Elders, and hence the villagers, did not do what they were told, and the designated Communist leader wasn't effectively running the village.

So the Communists shot those Ten Elders, and any individuals

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who'd conspicuously disobeyed their orders—and repeated those orders to the new Ten Elders. These in turn rejected the new-fangled, contra-traditional orders —and had their heads lopped off in the village square. The Reds repeated the orders to the next Ten Elders . . . and eventually they got Ten "Elders" who weren't very old, but quite practical, and did what they were told. After all, keep up that process of elimination long enough, and you're sure to find someone who'll take orders—and under the Oriental philosophy, terrorism and casual murder of opponents is good, standard, practical tactics.

It worked, didn't it? And China didn't lose much, did it? They've still got plenty of people, so that shows to any practical Oriental Communist philosopher that that was a sound, sensible, New Thought approach to an old problem.

They finally got China out of the ancient ways, into a modern nation. Nobody else had been able to, so that shows they were right, doesn't it?

Now obviously with this excellent example of how to control and modernize his nation before him—and its success in North Vietnam—Ho Chi Minh & Co. have reason to apply the same simple, direct-action methods in South Vietnam at the earliest possible moment.

As I say, give them three to four weeks, unopposed by U.S. troops and U.S. equipment, while they're backed with plenty of Communist firepower, and there will indeed be peace in Vietnam.

And if you, personally, are looking for a place of peace and quiet, where you will not be disturbed by the complaints and cries of those around you, try the local cemetery.

It is perfectly true that we can bring an end to the Vietnamese war by simply withdrawing. Even the terrorism will be ended at last, in just a few months—and it'll stay ended for a generation or so, until a new crop of individuals, who insist on thinking for themselves, grows up. (See Czechoslovakia, for an example.)

What the loud-mouthed Peace chanters are asking for is a quick, simple ending of the screams of pain coming from the war zone. The quickest way to stop the screams of someone who has been seriously hurt is to shoot him. He'll stop complaining at once, and your nerves can rest.

That same technique applies to stopping the complaints of terror in Vietnam. And in Biafra; just wait a few more months in Biafra, and they'll all have starved to death, and that will leave no one complaining about misery. All will be peaceful, and the world can relax again.

All the misery of South Vietnam could also be stopped, even more

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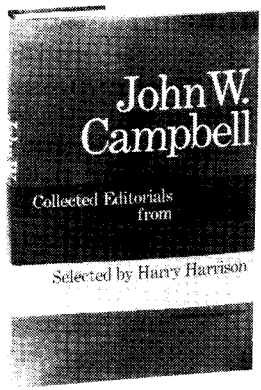

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quickly, by a thorough, saturation, overlapping hydrogen bombing of the area. That would leave no one alive to complain and make you aware of misery. That could be even quicker than letting the Vietnam Communist bring order, peace, and cooperation.

Remember that in addition to all present South Vietnam government officials and their families, all the North Vietnam anti-Communists who fled North Vietnam when Ho Chi Minh & Co. first took over would be marked for death as counter-revolutionaries.

These events, however, would not be covered by ABC, CBS, and NBC TV newsmen on the scene—nor by the press of France, Sweden, Germany, et cetera. Nor would *Tass* carry much on the subject. There would be no perceptible complaint heard in the world. Not even personal letters written from prison to outer-world recipients.

The anti-war people who are genuinely humanitarians, inspired by their sorrow over the reign of terrorism, want to do *something* to stop the screams of agony assaulting their nerves. Letting North Vietnam muffle the shrieks would do that, of course.

The anti-draft "peace" advocates have a different problem, and for

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dragon's teeth

The fact that a government wants peace does not prove all its officers do—and even a few high officers, with small allies, can assure there will be no peace!

M. R. ANVER

Illustrated by Kelly Freas

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His arms and legs were not tied and he was free to move around, but he sat motionless on the chair, hands clenched tightly together in his lap. He stared through the thick glass partition, which comprised one wall of the small room, at his two observers who watched with dispassionate interest.

The desire to cross the room in one stride and pound futilely on the glass was almost overwhelming but he forced himself to remain still, only a slight quiver of his shoulder muscles showing how much the effort cost him.

I won't give you a damn bit of satisfaction, not anything! he thought with savage desperation, biting his lip to keep from screaming it aloud. He knew they were listening as well as watching, that the room was wired for sound besides being completely isolated from the rest of their environment. And of course it had a separate air-filtration system; the hum of the unit was the only sound other than his own breathing.

He wondered where the air went. Somehow, the insignificant question seemed very important. *Perhaps they planned to bottle it, sell it on the open market as instant death,* he thought bitterly, and his throat tightened. *I've got to relax,* he told himself, averting his eyes from the gazes of his viewers, but the tightness remained and seemed to spread downward to his chest.

He froze, suddenly breaking into a cold sweat. It couldn't be starting, not yet, not so soon. If he kept his muscles from tensing, the feeling would disappear; he was sure of it.

He took a deep breath to help steady himself but somehow could not seem to get enough air. He took a second breath, then another with the same results, a vise closing around his ribs. His head began to throb and the room and his observers wavered.

It was happening. *Don't show them anything!* he ordered his body, but his body perversely disobeyed, respiratory rate increasing, breaths quickening into wracking gasps.

Involuntarily, he stood up and staggered as the room began to red out.

One of his observers glanced away from him to a chronometer and marked the time down on a pad he held in one hand. He turned his pale eyes back to the man who now lay on the floor, chest jerking spasmodically.

"I give him thirty seconds more," he said to his companion. "Total time from the triggering stimulus until release and disease onset is, it seems, six point two-three minutes."

His companion dipped his chin, his narrow face, topped by a high crest of green scales, approving. "An excellent demonstration, Ryx. Thank you."

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"All preparations have now been made," the announcer on the televiewer stated as a picture of the domed city on the asteroid Regin appeared on the screen. "The Cadosian delegation landed here this morning, and the Terran delegation headed by Ambassador Mansfield and Council Leader Bendixen will be arriving at 0800 hours tomorrow. The agreed-upon cease-fire has now been in effect for eight days without violations by either side's star fleet and it is hoped—both by the people Terra and the inhabitants of Cados—that this peace conference will lead to a lasting settlement of the war, a war in which heavy casualties have been inflicted on both sides.

"This charred scrap of lifeless rock," the announcer continued as the picture changed, "was the Terran colony of Tyche, attacked and totally destroyed three years ago in a raid by the Cadosian fleet. The destruction of Tyche initiated the war which has for—"

"Shut that off," Jarrett said, coming into the lounge.

Someone complied as the attention of a small group of people seated around the viewer shifted to the speaker. He was a stocky man with rumpled blond hair, lines of strain and fatigue etched in his face, dark smudges under his eyes. He walked to the front of the small room and sat down on a low table facing the others. A guard wearing a regulation gray-blue one-piece uniform and a light-weight helmet followed him inside, stopping by the wall next to the door.

"I'm Colonel Jarrett," the blond man began, provoking raised eyebrows from several of his listeners who looked skeptically at Jarrett's plain black pullover and breeches. "Have you met each other?" he queried, glance skimming over the six faces regarding him.

A lanky, balding man in his mid-fifties rose. "More or less. Some of us are already acquainted," he said, acting as informal spokesman for the four men and two women. "Are you finally going to tell us why we were brought here?"

"In a minute, Dr. Cooper."

"The mystery of Military Intelligence," another man muttered loud enough for Jarrett to hear, and Jarrett sighed.

Not wishing to antagonize the highly trained scientists he had gone through such pains to hastily transport to Regin, he replied patiently, "No mystery involved. I'm waiting for Dr. Kilburn from the hospital here on Regin to arrive; then I'll explain the entire situation to all of you."

"Stan Kilburn, head of internal medicine?" one of the women inquired.

"Yes."

"Our speculations may be quite accurate," Cooper said, leaning back in one of the contour chairs and folding his arms. "It will be interesting to find out."

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Jarrett grimaced, then looked over the heads of the group as the pneumatic door of the lounge slid open, admitting a brown-haired man with a square, ruddy face marred by a large bruise on the forehead. His left arm was in a sling and as he walked, he limped slightly.

"Stan!" "What happened to you?" "Are you all right?" Several members of the group spoke simultaneously and Kilburn grinned cheerfully.

"Cooper, how are you? Dr. Liu . . . Kari. Well, I was knocked cold but I'm all right, at least according to our radiology department. Just abrasions and contusions. The engine of my aircar malfunctioned . . . for absolutely no reason . . . this morning when I was on my way over here, and I had to take a slight detour through the hospital. Sorry to delay whatever this meeting is, Jarrett."

"That's O.K. Sit down, Doctor." Jarrett turned to Cooper. "I'd be interested in hearing your speculations, if I may."

"For some reason which obviously concerns the peace conference tomorrow, you've gone through a great deal of trouble to assemble this medical contingent. Since we've heard nothing about any disaster, it's safe to assume that it's something you expect, not something already happening." When Jarrett did not respond, Cooper prompted, "How about confirming or denying my statements as you hear them?"

"Confirmed."

"That was the easy part," Cooper admitted. "Now, as to how the personnel apply. You've recruited Dr. Gorenko and her colleague, Dr. Anders, World Government epidemiologists from the New Pasteur Institute on Elmalkah, which indicates you expect a disease outbreak of some kind. You've recruited my charming co-worker Kari Larsen and me from Alpha Lab II and our work, as everyone knows but seldom acknowledges, has to do with the application of biological agents to warfare. We're currently doing research on viroids.

"Also, you've recruited Dr. Liu, specialist in molecular biology and a man who's worked more with viroids than any other besides Ketteridge on Terra. Why isn't Ketteridge here?"

"There was no time," Jarrett said tersely. "I had to use the most available as well as the most competent personnel. But go on, please."

"Finally, you've got Stan Kilburn who knows the domed city and its medical facilities. Therefore, Jarrett, I—or rather, we—conclude that we're here because biological warfare may be employed at the peace conference. The only questions are: What organism and which side?"

"Theirs." Jarrett's voice was flat.

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"As for the organism, I know that, too. The questions are: How and when will the Cadosians introduce it?"

"So the Cadosians' offer of peace was a lie!" Kari Larsen, a fair-haired Scandinavian woman exclaimed bitterly.

Jarrett shook his head. "Their desire for peace is as sincere as ours. Neither side can take much more of the kind of war we've been waging, despite our respective propaganda campaigns. But there is a militant group on their side that wants to continue until Terra and all her colonies are decimated. Several members of the group are high in the Cadosian regime. Still, they haven't got enough power to block the conference so in lieu of that, they plan to sabotage it and take advantage of the reaction on Cados to end the cease-fire and renew the war, minus some of their peace-minded leaders."

Kilburn looked at him thoughtfully. "That's insanity," he stated quietly.

"Fanaticism," Jarrett agreed. "But fact."

"Are you sure about this plot?" one of the epidemiologists inquired too politely.

"Reasonably."

"I think for something of this magnitude, you have to be more than 'reasonably' certain."

"If I knew everything about it, I wouldn't need you," Jarrett told him more snappishly than he had intended. He ran a hand through his hair. "We have information from two sources. One of them was an operative of ours, posing as a mercenary fighting for the Cadosians. He got word that the peace opposition had decided on biological warfare to wipe out the conference. He's dead now," the Intelligence man added almost absently. "He never was able to tell us what organism they plan to use. The other source is here and I might as well let him talk to you. Jen?"

The guard at the door walked measuredly to the front of the room. He removed his helmet, and the entire group recoiled involuntarily.

The Cadosian's superficial appearance was humanoid. He had approximately the same build as Terrans, his lighter bone structure and smooth, faintly green-tinged skin concealed by the Terran Combined Forces uniform. Without the helmet, his face looked quite different: thin, with colorless eyes, the skull hairless and dominated by a single row of upright green scales which arched into a crest, faintly resembling the scalp lock of a Mohawk Indian, and then decreased in size and height as they disappeared under the uniform collar. He turned slightly to glance at Jarrett, his profile revealing a small slit, set low on the side of his head, which served as the opening of his external ear.

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"Jen has the Cadosian equivalent of my position," Jarrett explained. "He's loyal to his own world. He's not a Terran agent." Looking at the four government workers who stared at the alien with expressions of incredulous horror, he concluded, "Relax, please. There's been no breach of Security. Go on, Jen."

"As Jarrett informed you," the Cadosian said without preamble, his English accented but understandable, "there are those in my government who would destroy the conference and prolong the war. My service learned of the cadre which is small but powerful; among its members are one of my superiors—a subdirector—and a minister on the Executive Council. Because of their organization and influence, concrete proof and accusation are impossible on Cados, which left me no alternative but to present my data to Terran authorities."

"Which leaves us damn few alternatives," Jarrett interjected. "If we pull out of the conference without explanation, any chance of peace is ended. If we accuse Cados of trying to sabotage the talks, their delegation will leave—same result."

"And if the cadre introduces the viroid at the conference, killing the delegates and the entire population of the domed city, the eventual outcome of the war will be total annihilation of both worlds," Jen finished tonelessly.

The lines in Jarrett's face deepened. "So, Doctors, Terra stays. With your aid and without attracting attention to ourselves, we have to determine how the Cadosians will try to bring the disease into the conference and stop them."

Twelve pairs of eyes regarded him solemnly.

"You told us you knew the viroid," Cooper said finally. "Which is it?"

"According to your classification system, Medea three tau."

The reaction greeting Jen's appearance had been minor compared to that following his prosaic statement.

"God!" Kilburn exclaimed, breaking the shocked silence, and Jarrett chewed his lip.

"The name means nothing to me," the blond said, "but I've been told that it's very lethal."

"To both our species," Jen added.

"There are many lethal microorganisms and numerous Medea viroids, but three tau is one agent which even Alpha Lab II will not touch." Liu, the small Oriental molecular biologist spoke in a muted voice. "What do you know about viroids, Colonel Jarrett?"

"Not much."

"They are my field as, of course, you are aware. Basically, they are viruslike particles, differing from terrestrial viruses in the following essential ways: their capsule is triple the thickness of even large Earth

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viruses and composed of tightly-interlocking capsids making them almost impervious to ultraviolet radiation . . . an evolutionary necessity since they originate on the second planet of a class B star, the carbohydrate component of their nucleic acid has a seven carbon ring and at one point in their life cycle they contain two types of nucleic acids. Otherwise, they are similar to certain terrestrial viruses, composed of one nucleic acid, protein, and lipid, and they multiply intracellularly.

"Seventy-five types and a variety of subtypes have been isolated, all from the Medea solar system. Some are comparatively nonpathogenic; those we at the New Pasteur Institute use as tools to study molecular biology. A number of isolates are quite virulent to humans and other species."

"Don't waltz around it, Liu," Cooper said curtly. "Some of them are damn virulent, affect Cadosians and not us; those isolates we work with at Alpha Lab II. But three tau is the most virulent viroid discovered. Humans and Cadosians are susceptible, as both species learned when they picked up the disease several years before the war started. The incubation period is a matter of minutes and death occurs shortly thereafter. It's a respiratory infection, transmitted by droplet inhalation. We don't study it at Alpha Lab II because the possibility of a lab infection exists. We have other suitable bugs less dangerous for us."

"A lab infection would lead to a plague," Kari Larsen concluded, "which would kill the entire laboratory staff. There is no known treatment."

"What about a vaccine—for prevention?" Jarrett queried.

"Never developed one." Cooper shrugged. "Because the viroid is found only in the Medea system, the risk of contracting disease is outweighed by the risk of playing with the bug long enough to attenuate it for vaccine production. However, we do have some antiserum, enough to give short term, though not absolute, protection to our delegates. If I contact the lab now, it can get here before they arrive."

"Go ahead. The communications people will scramble your message." The blond man turned to look at Jen. "Any chance of your delegation consenting to receive the antiserum, too?"

"Not without knowing the exact reason for the injection; and if you tell them the truth, they will not believe you . . . as they will not believe me."

Jarrett thought for a moment. "Then," he said slowly, "under a pretext such as protection against a contagious disease currently affecting one of the Terrans."

Dr. Larsen shook her head. "That won't work, either, Colonel. Medea three tau is about the only

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single microorganism which produces disease in both Terrans and Cadosians."

"Extrapolation is hardly needed." Jen directed his words to the scientists, and Jarrett rose.

"Most of your questions have been answered. Now I have some for you, but first I want to take you to the conference hall building itself."

The building was a geodesic sphere located near the center of the domed city, half a kilometer from where the medical group had assembled. They walked the distance silently, most of them lost in abstract thought. Jarrett took them through one of the entrances which avoided the concourse crowded with members of the news media, past an array of Security guards, into the huge circular main hall.

The room was prepared for the coming negotiations, placards with delegates' names in Terran and Cadosian on the center round table, microtranslators, tapes, papers, and writing material at each station. For the moment, however, it was empty, the sound of footsteps echoing hollowly off burnished floors and shimmering crystal-faceted walls.

The group arbitrarily chose seats in the galleries which formed a horseshoe around the edge of the room, ending at the large double doors connecting to the concourse; Jarrett gave them a brief resumé of the building's floor plans and then began to dig for information.

The session lasted an exhausting two hours. When it ended, Jarrett directed the medical people out of the room and to an aircar which would convey them to their quarters.

"I'll contact you within the hour to arrange specific assignments and get any other suggestions you may have thought of," he said in parting.

Turning back to Jen and Kilburn, whom he had asked to remain behind, he motioned them back inside the building. Going down the hallway which encircled the sphere behind the main hall, Jarrett ducked into a small, unoccupied cubicle of a lounge and sat down in the most convenient chair with a thump.

"Got to have some coffee or I'll fall asleep standing up," he explained, pouring the steaming black liquid from a table dispenser.

"Commiserate later," Jen told him with an unexpected smile. Seeing Kilburn's startled look, which the doctor hastened to conceal, he added, "When not slaughtering Terrans by the millions, my race does have a sense of humor . . . contrary to popular belief on your planet."

"His planet is Regin and humor will have to wait until this is over."

"If then," Kilburn said soberly.

"Yes." Jarrett rotated his coffee cup meditatively between his hands.

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"Before unleashing the specialists, I wanted to talk the whole thing over with both of you, using their recommendations as a starting point."

"You're to co-ordinate the whole thing, then?" Kilburn inquired.

Jarrett nodded, taking a swallow of coffee. "From what the others have told me, the cadre won't be able to introduce the viroid in the coffee supply, or more seriously, in the water supply or walk up to someone and poke him with a loaded spray hypodermic."

"The last would kill the victim, all right, but disease spread would stop there, providing an over-enthusiastic pathologist didn't do an autopsy in the middle of the hall. Parenteral injection leads to rapid death but for transmission, three tau has to be inhaled."

"Then the plague will be introduced one of two ways." Jarrett repeated the epidemiologists' theories. "Carried by someone in a form that will nebulize or a volunteer walking case."

"Who," Jen pointed out, "would have to be infected in the concourse for him to live long enough to walk into the hall, provided Security lets him through."

"The former sounds most plausible to me." Kilburn shook his head. "God. It would have to be a suicide mission; the person nebulizing the viroid will, of course, never get out alive. He might as well go in as a walking case."

"There are four side entrances, Jarrett," the Cadosian observed.

"Affirmative, but there will be a cordon of Security guards in front of each one."

"Security has been breached."

"That, Jen, we both know." Jarrett finished his coffee and poured a refill. "We'll close the side entrances to everyone, no matter what I.D. he shows. Anyone entering will do so through the concourse. We'll also close the galleries to the news media. The negotiations themselves naturally won't be on tri-D but they wanted coverage of before and after the sessions."

"A logical step," Jen agreed.

Kilburn rolled his eyes. "The screams will be heard all the way to Terra, without amplification."

"Too bad." Jarrett dismissed the feelings of the press. "Does the cadre control any of the Cadosian delegation or their Security contingent, Jen?"

"No."

Jarrett seemed content to accept the Cadosian's statement as complete truth, and Kilburn fidgeted uneasily.

"Then we can speculate that Medea three tau is already here, on Regin," Jarrett continued.

Kilburn sat bolt upright, wincing as strained muscles protested. "On Regin *now*?"

Jen stared reflectively into space, his thin face expressionless as Jarrett kept talking.

"It's unlikely to come with the

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peace delegation. It was probably brought by a disguised Cadosian—they have excellent plastic surgeons, Doctor—or a mercenary. The form Dr. Cooper suggested, inside small, explosive, hermetically sealed projectiles which themselves will be frozen until use I guess is the most plausible. And I think a Cadosian will do the actual infecting; this is too crucial to be left to the whims of an uninformed mercenary."

"Weapons misfire, targets are obscured, a slight miscalculation of time and an opportunity is lost. Witness many abortive assassination attempts on various individuals. Were I directing this sabotage plot, I would prefer to know positively that the plague was going to walk into the hall, not chance the risk of infecting one of the delegates in the interval from the moment he leaves the aircar, which will land with its door flush with the concourse entrance, until he passes through the double doors. For this endeavor to be successful, the plague must begin in the main hall itself."

"Sniff the viroid and go inside. I like your logistics, Jen, but if the cadre owned the delegates they wouldn't need Medea three tau."

"On Regin now," Kilburn repeated hollowly, staring out a window at the slim, sweeping lines of the domed city. "Can . . . can we evacuate the city on some pretense, for instance—"

Jarrett's blue eyes hardened. "No."

". . . And a message has been sent by the U.S.P. workers to the Port Authority protesting the complete shutdown of Regin's heavily used spaceport, closed by governmental edict for the past two days," the newscaster reported. "The sole vessel landing during that time has been the one transporting Cados' delegation to the conference, and the only other expected to make planetfall will, of course, be that of the Terran delegation. Estimated arrival time of their ship is 0800 hours tomorrow, less than thirteen hours away."

"Message in from the epidemiologists at the spaceport," Jarrett said, seated at a small communications panel.

Jen turned down the audio, leaving the tri-D announcer to mouth silently on the viewer. "Anything?"

"Not yet. The two of them and the personnel they've chosen have searched two-thirds of the ships grounded at the port. Odds are they won't find the viroid there, but I couldn't chance not inspecting."

"You have deployed the team well. Two at the spaceport, the Alpha Lab microbiologists and assistants working in a spiral pattern from the conference hall and feeding their data to Dr. Liu—"

"And me sitting here, stiffening up," Kilburn added morosely,

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slouched down in a contour chair in the corner of the room currently serving as headquarters. "Why did you pick me, Jarrett?"

"Because you're a physician and you know the domed city." Jarrett pivoted away from the communications panel and stood up. "And now we're going to use you. Read through the list the computer gave you, Jen."

The Cadosian glanced back at the gesticulating announcer on the tri-D viewer. "Intriguing," he commented, blanking out the picture.

Jarrett grinned and his strained expression momentarily disappeared. "The list."

Jen unfolded a paper he had withdrawn from a pocket of his uniform. "Originally I began with the names and home ports of all vessels arriving on Regin during the past several weeks. After elimination of most of the ships because planting a Cadosian agent would not have been feasible—either due to the type of vessel or the planet of origin—I have reduced the number of possible suspect ships to four, the number of suspect crewmen or passengers to nine. Since a sector of the domed city is maintained almost solely for off-worlders and since the agent or agents will not want to be conspicuous by staying elsewhere, we can begin checking there immediately."

The off-worlders' section of the domed city was also the main entertainment center, a kaleidoscope of lights and prisms reflecting off exotic architecture, much of it alien in design. Far above the streets and malls, the curving dome revealed black sky and pinpoints of stars, pallid when compared to the night scene below.

Kilburn avoided two tipsy soldiers and put his left hand in his pocket. Despite the fact that nothing was broken, his shoulder and back still hurt; however, he had discarded his conspicuous sling. He hurried to stay abreast of the cloaked figure next to him.

Jen was no longer wearing a Terran uniform but instead more flamboyant—and appropriate—evening dress. Cloaks being in style simplified his disguise, the crest of scales and ear-slit hidden by a hood. He and the doctor were methodically visiting entertainment places where an agent might choose to melt into the crowd. Some of the numerous spots in the sector Kilburn had rejected as overly exclusive; illegal, therefore likely to be raided by the Regin police; and having a cover charge too large a sum for an individual to spend without attracting a degree of unwanted attention. The locations where heteroclite sex practices as well as the Terran variety could be found Jen had vetoed investigating on the grounds that they would be too revealing for one of his race even after plastic surgery and Kilburn, with a dreamy half-smile,

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agreed that they could become excessively distracting for a Terran mercenary with a designated mission.

The two continued walking toward a pyramid-shaped structure which changed colors, flowing from a deep amber to orange to fiery red. As they passed through a gossamer curtain in the building's entrance, Jen pressed one finger against an ornamental cloak fastener at his throat and said quietly, "Jarrett."

He paused, listening, then continued, "Nothing. Understood. Out." He dropped his hand.

"How's Jarrett's breaking and entering?" Kilburn asked, raising his voice to be heard over a burst of music.

Jarrett, after leaving them near the center of the entertainment sector, had taken the aircar in order to check out the hotels and other locations where the nine individuals in question were quartered.

"Fruitless thus far." The Cadosian stared at a huge circular bar in the center of the main room, illuminated by constantly-shifting hues of blue-green light, then threaded his way through a crowded dance floor to a table. He sat down and Kilburn eased himself into a chair.

"Hard to see much of anything in this light."

"It is sufficient," Jen said turning slowly in his seat to scan the multitude, the greenish tint of skin over his cheekbones accentuated by the room's illumination. He ignored the waiter hovering over them, leaving the ordering of drinks to Kilburn.

"What do you think of our alcohol?" the doctor asked after dispatching the waiter. He grimaced inwardly at the inanity of his question; unlike Jarrett, but like most humans, he had a vague but uncontrollable feeling of revulsion toward the Cadosian race.

Jen did not appear to notice Kilburn's tone of voice. "Tasteless," he replied, still concentrating on the people in the room.

Kilburn shrugged, winced, and swiveled around to watch the bartender and his robot assistant. As he did so, a thin, gray-haired man seated at the bar with his back to Kilburn turned away from his empty glass and rose, his ornate gold and blue cloak swirling behind him.

He glanced casually in Kilburn's direction; then his eyes stopped on the table's two occupants and he froze, his face a rigid mask of surprise and fear. The reaction lasted only an instant. Galvanized into sudden movement, he spun away and pushed past the couples on the dance floor.

"Jen—" Kilburn began, but the Cadosian was already on his feet, starting in pursuit. He was through the entrance in several long strides, Kilburn following as fast as possible. Outside, the gray-haired man

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paused long enough to throw a quick glance over his shoulder, then bolted, disappearing down the street.

"An aircar port on the roof two buildings over," Kilburn called, unable, because of his injured leg, to match the Cadosian's strides.

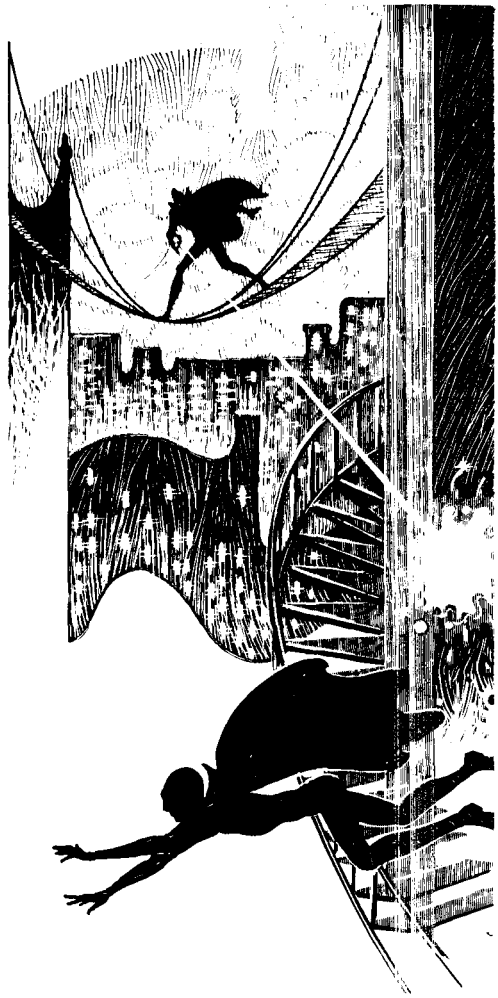
Jen increased his speed, leaving the doctor behind him. Dodging around several incurious pedestrians, he gained ground rapidly.

His quarry gauging the distance of his pursuer and to the port, abruptly turned into a side passage. Jen nearly overran it. Checking himself, he sprinted after the gray-haired man who, upon reaching a back stairway of a hexagonal building began scrambling up it three steps at a time. The Cadosian lunged after him.

Halfway up, the man stopped suddenly and whirled, a small laser pistol appearing magically in one hand. Jen's reaction was instantaneous. He dived over the railing and landed rolling as the beam streaked past him. Reaching under his cloak for his own weapon, he came to his knees, but the man did not attempt a second shot. Instead, he continued climbing toward the roof.

"Are you O.K?." Kilburn called from close behind Jen.

"Stay back," the Cadosian ordered without looking around. Holding his laser ready, he raced up the stairs in time to see the man start across one of the spider-web



type bridges spanning some of the roofs of the domed city's buildings. Jen sighted his pistol, then hesitated. With a sudden inspiration, he yelled, "Stop!" in his own language and dropped the hood of his cloak.

The call brought the man to a plunging halt. Eyes widening, he remained motionless as Jen walked slowly toward him, the muzzle of

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his laser pointed toward the ground.

"You are also with the cadre," he said softly.

The man dipped his chin. He replied in Cadosian, "What are you doing here? What—"

"Were you not informed?"

"No! Why are you— What are you doing with—" He choked suddenly and raised his laser.

Jen deflected his arm, discarding his own weapon at the same time; its use at such close range would have been lethal. His hand flashed out toward his opponent's neck, simultaneously blocking the counterblow which verified his suspicions. Their fight ended after several brief, savage exchanges. The man collapsed in a heap at Jen's feet and the Cadosian, pulling the hood of his cloak back over his head, pressed the cloak fastener against his throat.

"Jarrett, I've got one of the cadre's agents. Home in on my communicator and bring the aircar over here." He accepted his laser from Kilburn who, disregarding orders, had come on the roof before the fight began. "Affirmative. Out."

"One of yours?" the doctor inquired, kneeling next to the prostrate form. He felt for heartbeat and moved his hand over to the right side of the chest. "Yes," he said, answering himself. "Plastic surgery is only skin deep." Interested, he leaned over to begin a more thorough examination.

Jen put a restraining hand on his arm. "Be careful. Some of them are mind-blocked."

"What's that?"

"I'm not sure about the medical details of how it's done but it is effective and used on some of our agents. A built-in destruct mechanism you might term it," the Cadosian explained absently, watching Regin police patrol. "If the agent attempts to volunteer certain information to anyone but the correct party, the block is triggered, and he dies."

"How do we get around it?"

"I'm not certain but evidently it's possible under specific conditions which Terran Intelligence must duplicate."

The unconscious agent stirred and Jen motioned Kilburn back, raising the laser. The man's eyes opened, staring blankly at the dome and black sky above him. Rolling his head slightly, Kilburn and Jen came into his field of vision. He jerked convulsively and Jen ordered sharply, "Be still."

"Nooo!" The word was a low moan. "Defect . . . defect—" The agent gagged, quivered, and went limp.

"Doctor!"

Kilburn was already next to the agent. "His heart's fibrillating. Breathe for him mouth to mouth," he commanded, placing the heels of his hands over the right side of

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the agent's thorax and beginning closed chest massage. He worked over the agent for almost five minutes before dropping his hands.

"Forget it. He's dead. So that's how your mind block works," the doctor added bitterly.

For the first time since Kilburn had met him, Jen looked disconcerted. "I . . . don't understand why."

Kilburn looked down at the dead Cadosian agent and bit his lip. "Don't you?" he asked almost inaudibly.

Jen's pale eyes narrowed but he did not reply.

"Checked out," Jarrett said dispiritedly, turning away from the large computer in the lobby of the hotel. "I found a throat mike on the body. He must have gotten a brief message off before you caught up with him, Jen."

The Cadosian dipped his chin slightly in agreement. Kilburn shifted his weight from one foot to the other, contemplating the floor.

Jarrett rubbed his eyes and sat down on the arm of a chair in the nearly deserted hotel lobby. Glancing at his watch, he muttered, "Less than nine hours until the Terran delegation arrives. Well," he continued, forcing a more animated tone of voice with an obvious effort, "the Cadosian who died was listed as Franz Stetten, a crewman on the *Aegis,* planet of origin: Thera. The other suspect from the same ship was a passenger—no photo available—M. Damian; he's the one that just checked out. We want him and any of his compatriots. Another of your race, Jen?"

"Most likely."

Jarrett swore softly. "If Damian were a mercenary, I could give the Regin police some pretense to pick him up; once they had him, we would work on obtaining answers. I'm afraid, though, they'd detect that he's a Cadosian on some of their screening tests. Catching a disguised spy in the domed city would create such an uproar that Terra would have to torpedo the conference. What a mess."

"He recognized you!" Kilburn blurted out, the bruises livid against his pale face. "He saw you and he ran."

Jen's expression revealed nothing. "I did not know the cadre's agent, nor did he know me. Like Jarrett, I seek anonymity and the cadre's contacts aren't that extensive."

"You mentioned that one of your superiors was a member."

"A subdirector, yes. But he's not the corpse we have in the aircar. Furthermore, no one is aware I am on Regin."

"So you say, but he ran."

"He saw *us* and he ran."

"It's not *me* that he—"

"Stop it!" Jarrett snarled, suddenly uncoiling from the chair. "Shut up, both of you. There's no time to stand here bickering. We'll

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go back to the car, leave the body at the hospital, and rendezvous back at the conference hall with the others. Outside."

"There will be more room in the aircar without me, and there's a line of investigation I wish to pursue." Jen spoke softly, his colorless eyes on Jarrett.

The blond man paused, then said, "I've got a couple of agents in the domed city. Do you want to use them?"

"Perhaps later. I'll keep communications open and you informed."

Jarrett stared at him for a long moment, then gave a wry grin. "Take off." He glanced at Kilburn who stood frowning as he watched the Cadosian leave the hotel lobby. "Something you want to say, Doctor?" he asked, voice revealing the tension he had experienced for the past several days.

"You know my position." Kilburn looked at Jarrett's taut face, then concluded, "For the present, no."

The Cadosian hailed a cab which took him through the congested traffic pattern over the off-worlders' sector and beyond it to the residential area of the domed city. In the dark, the huge circular towers, sparkling with light, presented an impressive aerial view. Each tower with its many tiers of apartments was a sufficient distance from its brothers to insure a degree of privacy, and between the buildings was a park, synthetic grass and trees creating a Terran-type atmosphere. Jen had the driver land the cab near a small illuminated fountain which sent silver droplets of water cascading over a figure of a dragon.

After the cab left he walked quietly through the park, discreetly avoiding couples in the darkness, the ersatz grass resilient underfoot. Finally arriving at one of the towers, he went inside and to the elevator, reaching inside his pocket for a skeleton key.

He rode the elevator to the twenty-sixth floor and stepped out, hesitating momentarily as he found himself in the middle of a sunken rock garden complete with a pond stocked with various Terran fish and real Terran water plants. Jen stepped gingerly over a small stone pathway to the more solid floor of the hallway encircling the elevator shaft.

On Cados, he reflected, trees and grass were scarce and time could be put to better use than cultivating ornamental baubles. Still, the aesthetics were pleasing; he wished he had occasion to investigate the domed city under more agreeable circumstances.

The Cadosian went to an apartment a quarter circle from the elevator entrance and fitted his key into the lock, his other hand dropping to his laser. The pneumatic door slid open noiselessly.

The interior was unlighted, unoc-

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cupied. Going inside and allowing the door to shut behind him, Jen groped for a small light to illuminate a portion of the apartment.

He was standing in a large living room, tastefully furnished according to human sensibilities, he supposed. Leading from the main room were two passages, one to a bedroom and a bath, the other to a kitchen. The entire place had an unlived-in appearance—neat and clean, no clothes in the closets, no food in the refrigerator.

Jen paced back to the living room. Negative results as anticipated. And, no reason now to tell Jarrett about the apartment his Intelligence Service maintained on Regin for various Terran mercenaries which they had opportunity to use. He liked and trusted Jarrett more than he thought possible with any human; however, the dictates of his profession deterred him from revealing all information. Jarrett, he knew, would understand.

The Cadosian bent to shut off the light. As he did so, the apartment door opened. Jen reached for his weapon but the other held his at readiness. The thin beam flicked out catching Jen in the side. His own laser slid out of suddenly numbed fingers as he fell. Temporarily unable to move, he lay on the floor, dark green blood soaking the fabric of his clothes and into the rug beneath him.

The other strolled over to him and casually kicked Jen's laser away. He lowered the hood of his cloak, revealing Cadosian features.

"Jen," he said musingly. "Very clever. You covered well. No one suspected, either in the Department or in our organization." Then, regretfully, "If I only had known."

Jen stared silently up at his subdirector, hand pressed to his injured side but blood seeping through the fingers nevertheless.

"You see," the subdirector continued, leaning comfortably against a convenient sofa, "we went through a great deal of trouble to bring Medea three tau to Regin and maneuver it so it would be taken into the conference."

Despite the pain, Jen started. "A carrier?" he whispered. "But they said it was impossible."

"Jen, do you believe humans?" The subdirector smiled dryly. "You are correct, however. A carrier, so the medical personnel declared, is impossible. No, we have what Ryx terms a 'defective infection.' Personally, I fail to see much difference but Ryx is quite adamant that there is some."

Jen's free hand started to creep toward his throat and the muzzle of the laser followed the motion.

"Leave the throat mike alone, Jen. I'd like to tell you this before I kill you, if you don't bleed to death first. I'm interested in your professional assessment of our plan.

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To explain in terms Ryx used to me, a carrier has an infection but no symptoms and his cells are producing organisms. The viroid is too lethal to allow such a state but with a certain type of treatment which is too esoteric for me to understand, Medea three tau can be made defective. It will get inside cells and form its component parts but can't assemble. The person so infected will be completely well and can't infect anyone around him until the viroid is triggered, which can be done by injecting another Medea viroid, a harmless one by itself."

Jen kept his eyes on the subdirector, slowly flexing his knees as the other talked, his movements partially hidden by the cloak.

"We went through much inconvenience to get the proper subject infected, to allow the Terran agent we captured to send precisely the desired amount of information, all of which could have been avoided had we known you were defecting. Naturally the ideal scheme would have been to infect one of our own delegates but governmental Security thwarted that."

Jen paused, unsure whether the nausea he felt was from the blood loss or the sudden revelation of exactly how the cadre planned to destroy the conference and how far Jarrett's team was from realizing their member's role as a Trojan horse.

"You do understand, then," the subdirector said, reading Jen's expression. "Of course you would. And what is your objective opinion, Jen?" He sighted the laser and waited.

"The Terran medical team . . . admired your . . . attempt."

The subdirector's face stiffened momentarily, then became bland. "They don't know, Jen. The transmission I received from Pythia before he died clarified that. Well, I see you're not going to oblige me either by exsanguinating or giving me an opinion. Therefore—"

Jen rolled into the subdirector's legs, knocking him off balance and over the arm of the sofa. Too weak to fight, even too weak to scramble under a chair for his laser, Jen staggered toward the door, almost falling into the hallway. The beam from the subdirector's laser burned into his back as the door slid shut.

He pounded the elevator button with his fist and its entrance yawned to receive him. The Cadosian collapsed inside as the laser beam cut into the wall above him; then he was going downward, sprawled on his back, watching the lights indicating floor numbers blink on and off with dizzying speed.

It would never do to find a Cadosian bleeding in the middle of a Regin elevator, he thought giddily as the lights reached One and the elevator came to a smooth stop.

He reeled into the empty lobby and through the glass doors to the

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park outside. Weaving drunkenly, he gained its comforting blackness and crumpled. With a great effort, he lifted one leaden hand to the throat mike and whispered, "Jarrett." It burned his lungs to talk. "Jarrett . . . Jarrett—"

"I despise clichés but this search for one individual of unknown appearance is like looking for a needle in a haystack, Jarrett." Dr. Anders, one of the government epidemiologists slumped bonelessly in his chair in the lounge, mirroring his colleague's frame of mind.

"He's right, Colonel," Dr. Gorenko, his co-worker agreed, pushing a wisp of black hair off her forehead. "Unless you can blanket the city with men . . . and you admit that you cannot . . . our best chance is to apprehend Mr. Damian or whoever has the viroid at the conference hall itself."

"That is too risky," Dr. Liu declared in his precise, clipped tone. "If Medea three tau were released—"

"Spare us the lectures, *please!*" Kari Larsen exclaimed, the irritation in her voice bordering on frank anger. "We all know what the viroid does, Liu, but we have no other choice since we can't find it ourselves."

"Of course it's risky," Cooper said placatingly, "but the Security precautions are almost airtight. I think since we know what we're looking for—the nebulizer and so forth—that we can spot the individual with it and more important, stop him."

"Has a carrier state ever been reported, rumored, or whispered about?" Kilburn asked suddenly.

"No." He received the answer from three different people, and Jarrett's blue eyes darkened.

"Yes, I'm thinking about the dead Cadosian agent," the physician continued, directing his words to Jarrett alone. "He saw Jen and he panicked. I'm not saying the Cadosian isn't what you believe him to be. But what if, unknown to Jen himself, they infected him on Cados and . . . God, I'm not thinking." He pounded his forehead. "Forget I said anything. I'll blame the mental lapse on the evening."

"Are you all right, Stan?" Dr. Larsen inquired solicitously. "You had the accident this morning and now—"

"I'm just stiff, physically and mentally," Kilburn replied with a rueful smile.

"A carrier state," Jarrett persisted. "What's wrong with what you said?"

"If Jen were a carrier, impossible anyway with three tau, he'd be releasing viroids with each breath; all of us and half the domed city residents would be dead by now."

"Colonel, how far can you trust the Cadosian?"

Jarrett stared at the speaker, Dr.

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Cooper, for a long moment before answering in a dangerously quiet voice, "As far as I trust any of you." He was about to add more when his body stiffened, hand going to the throat mike beneath the neck of his pullover. "Jen—" He broke off, listening as his face blanched. "Jen. Jen! Damnit! He's holding the thing on Transmit." He stood up jerkily. "Something's happened to him. Kilburn, take your medical bag. You and Anders come with me. The rest of you stay here with the com." The last was thrown over his shoulder as he left the room, the other two at his heels.

Pausing only long enough to beckon to one of his agents standing in the hallway, Jarrett ran up the escalator to the aircar port on the roof of the building. He slid into the driver's seat and had the aircar flying while Anders was still struggling to get one of the doors shut securely. Activating a homing device on the car's panel, Jarrett cut across one of the main traffic patterns and away from the conference hall vicinity.

"What did he say?" Kilburn ventured.

"He was almost incoherent. Kept mumbling my name, then yours several times . . . I think he needs medical help . . . then said something about park and twenty-six M. After that he stopped talking and left his set on Transmit."

"Park and a number. He must mean an apartment in the towers."

"Is that in the direction we're headed?"

"Yes."

Jarrett opened the throttle and the little machine shot forward, avoiding two midair collisions by narrow margins and eluding a Regin police patrol which attempted pursuit. Over the glittering towers, Jarrett began to circle the aircar, again following the homing device. The aircar gradually lost altitude as Jarrett spiraled it downward, the radius of its circles steadily decreasing. Finally he brought it to hover and using the landing lights, set the craft down near one of the towers.

"He's somewhere in this immediate area," Jarrett informed them grimly, the beam of his flashlight tracing between trees and along a patch of grass. "You two go over—"

His words trailed off as the edge of the light revealed a cloak and outflung arm. Directing the light, he ran forward.

Jen lay on his back, the cloak fanned around him. One hand rested limply over the ornamental fastener at his throat. The Cadosian's pale eyes were open, meeting the flashlight beam with a glassy, unwavering stare. Jarrett flinched, then handed the light to Kilburn.

"Doc," he said almost inaudibly. Gesturing to the agent with him,

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he started toward the apartments.

Kilburn bent over the still figure, verifying death with a cursory examination. After closing the fixed, dilated eyes, he removed Jen's cloak and covered his face.

Anders shook his head. "I guess there was no doubt about how much to trust him."

"No." Kilburn sat down on the grass and distraitly pulled at the firmly anchored blades. "I feel somehow responsible," he muttered.

"Why should you, Stan?" the epidemiologist asked sharply.

"Maybe if I hadn't shot my mouth off—"

"Never mind, Doc. It wasn't your fault," Jarrett told him listlessly, coming back from the tower.

"Anything there, Colonel?"

"Negative, Dr. Anders, except for blood all over the floor." Listening to the microreceiver inside his ear, the blond man said, "Jarrett here. Five hours out. Understood. Switch me over to the Terran flagship." He straightend his shoulders. "That was a message from Regin Spaceport Control. They've picked up our delegation's ship and escorts on their long-range sensors." His lips white, he added softly, "I'm going to buy us a little time."

"In approximately four minutes, if all goes according to schedule as it has thus far, the Cadosian delegation will arrive here at the conference hall," the tri-D announcer said briskly, standing on a movable raised platform in the concourse. "Despite stringent security precautions which have consisted of cordoning off an area a half-kilometer square around the hall and forbidding all unauthorized spectators even to watch the delegates enter the building, the concourse, as you can see, is filled with people. I see the mayor of the domed city and his staff, the Port Authority Commissioners, Ambassador Barnes from the Vega colonies . . ."

The announcer's eyes stopped on a stocky man with tousled blond hair and a haggard, tense face, noticeable not only by his demeanor but by the plain, rumpled clothing he wore which contrasted with the formally dressed dignitaries surrounding him. Maybe he was Security, the announcer thought and shrugged.

". . . General Rice, Vice Admiral Morril—in short, ladies and gentlemen," he continued unctuously, passing over Jarrett to scan the rest of the crowd, the camera following obediently, "an extremely impressive array of Terran civilian and military officials gathered for what is perhaps the most significant . . ."

Jarrett, after a brief side glance at the announcer, moved farther back into the crowd.

Security had cleared the tri-D crew covering the delegates' en-

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trance, but their vantage point still bothered Jarrett, despite the semicircle of soldiers hemming the cameras. Large as the crowd was, with every person supposedly authorized, the Security contingent swelled it to almost twice its original size. Through predominantly human—Terran and Regin forces—there was a sizable sprinkling of Cadosians who had arrived with their delegation's ship. Loyal to their own, not controlled by the cadre, Jen had maintained.

A muscle in Jarrett's cheek fluttered and he pressed one finger against it. He had trusted Jen but what if . . . if—

He shook his head and kept moving through the people, avoiding two more members of the ubiquitous Terran Combined Forces. They had already stopped him twice, probably because, he thought sourly, I look like a suspicious, disreputable character.

The appearances of the entire medical team and his agents were similar; luckily they were widely scattered through the crowd, which made them less conspicuous. Each was armed with a palm-sized stunner since a person fainting in public would attract far less attention than one with a neat hole burned through him.

Jarrett did not crane his neck to locate his people. He worked his way through the concourse, watching for a hood, cloak, or unusual hat or the deceptively light-boned Cadosian build. On this, he had also agreed with Jen. Their quarry would not be human.

Outside the building, a band suddenly began to play eerie, high-pitched notes which did not adapt themselves well to human instrumentation, and conversation in the concourse ceased. Forming two lines, the soldiers opened a pathway from the entrance to the massive double doors, packing diplomats and high officials unceremoniously against the walls. Jarrett turned his back to the entrance. He had positioned himself in the front row of people, immediately behind the soldiers. It was a vantage point for viewing the arriving delegation but he had eyes only for the crowd.

The dignitaries were attempting to peer over the guards' shoulders without acting like gawky onlookers. Ending on a final wavering note, the discordant refrain died away as the Cadosian delegation entered the concourse. Jarrett pivoted for a brief look while the Terran soldiers shoved spectators even farther from the center of the room.

The Cadosian delegation had reached the mayor and stood facing him, pale eyes staring past him. Clothing of an iridescent green material and narrow sinuous jeweled belts accentuated the race's reptilian characteristics. Flanking them were black-uniformed soldiers of their own military.

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The mayor stuttered, then with the poise of a professional public servant, launched into his welcoming speech. Jarrett heard it without really listening. Fingers curled around the stunner in his pocket, he scanned the interested human faces and the occasional impassive one of a Cadosian Security agent before him, watching for any sudden movements: a lift of a hand, a decisive turn of a body.

"We welcome you and wish you good fortune," the mayor concluded.

The Cadosians acknowledged his effort with a simple, "Thank you." Leaving him, they hurried into the main hall, their troops forming a wedge around them.

"Jarrett, they're inside. Doors closed," a tiny voice said in Jarrett's ear. The rest of the electronic equipment turned the radio transmission into near garble.

"Are they all O.K.?"

Jarrett's agent within the main hall replied, "They seem to be."

Jarrett removed his hand from his pocket and wiped his palms on his breeches. He muttered, "Why?" loud enough to evoke a curious glance from a woman standing near him. Why hadn't the cadre attempted to infect the Cadosian delegation? They knew one of their agents died and they had killed Jen. Then, they also must know, he thought, mind racing as his eyes skipped from face to face, that measures would be taken to protect the Terran delegates. Why hadn't they used their own race to bring the viroid inside the main hall . . . unless the Security precautions had thwarted them. Or unless there was another way . . . one which even the experts overlooked.

"Attention. Attention, please," the PA system crackled, and he twitched involuntarily. The words were repeated in Cadosian. "We have just been notified," the voice said again in English, "by Regin Spaceport Control that the Terran delegates' ship has reported a hyper-drive malfunction, causing a delay in time of planetfall. More information will be relayed when available." It began to translate the statements into Cadosian, and the soldiers broke their lines, allowing people to congregate in the center of the room. Jarrett let himself be carried forward with the press of bodies.

Someone touched him on the arm and he turned to see Kilburn. "Was that your doing?" the doctor asked, rubbing his eyes.

Jarrett nodded, gazing past him at the crowd. "Logistics involve time as well as space, and the cadre is on a tight schedule. I want to see how this affects their plans," he explained, not concentrating on Kilburn. A tall, thin man wearing the uniform of a Terran Combined Forces major bumped into him and Jarrett absently moved sideways, steadying Kilburn as he collided with him. He focused on the doctor

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for the first time. "You look beat, Doc. Go lean against the wall while we're waiting."

"I think I will," Kilburn mumbled.

Jarrett squeezed toward the entrance of the concourse in order to obtain a better over-all view of the room. Though exactly what he was looking for, he thought bitterly, he didn't know. What he saw immediately was Liu threading his way toward him, barely visible between taller individuals.

The small Oriental began breathlessly, "Colonel Jarrett—"

"Don't stand in front of me," Jarrett ordered. "All right, go ahead."

"A statement by Dr. Kilburn last night has set me thinking about the most desirable way to introduce an infection other than the scheme we postulated. The virulence of Medea three tau makes a carrier an impossibility; however, with some of the nonpathogenic Medea viroids we have been able to produce a somewhat similar state in cell cultures but without cellular release of the organism," Liu lectured. "It occurred to me that, if the Cadosians had the knowledge, this would be an ideal method, certainly more effective than the risk of a nebulizer. I think if properly treated, Medea three tau could be made defective."

Jarrett frowned reflectively. "Defective," he repeated. "Could you recognize a person infected that way?"

"No. But it would not be difficult, of course, once the defective agent were triggered by an intramuscular injection of a relatively harmless viroid to produce clinical disease," Liu replied pedantically.

Jarrett stared at the groups of people in animated conversation. "Then anyone here already could have it," he whispered. He fought down a rising wave of panic. "No, that's wrong. It has to be someone the cadre is certain will be present and allowed inside the main hall once the conference begins."

"The delegates," Liu suggested.

"No. Who else has clearance besides the delegations and the eight of us—" Jarrett's eyes widened, changing from blue to black. "The agent said 'defect,' and it killed him," he muttered incredulously. "I thought he was trying to accuse Jen of being a defector. But he died because he started to tell the truth, not about Jen—about . . ."

"I don't understand you."

"Kilburn!" Jarrett glanced through the crowd, locating the doctor who, taking his advice, was leaning against a far wall. "Jen tried to tell me, too, as he was dying."

Liu persisted, "What do you mean?"

"Stay here," Jarrett commanded. He started slowly toward Kilburn, watching people ebb and flow around the doctor. Nobody seemed

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to pay attention to him but now Jarrett knew that there was at least one individual vitally interested, desperately interested in Kilburn's movements, though too clever to be obvious in his surveillance.

He reached Kilburn, putting a companionable hand on his shoulder. "You look tired, Doc."

"Yes. Aren't we all?"

"Still hurt from the accident yesterday?"

"Some." Kilburn regarded Jarrett quizzically.

"Why don't you go inside the main hall and sit down in one of the galleries," Jarrett prompted, elevating his voice fractionally.

"I don't need—"

Jarrett's fingers closed like a vise on Kilburn's upper arm. "You really look tired," he said, smiling affably.

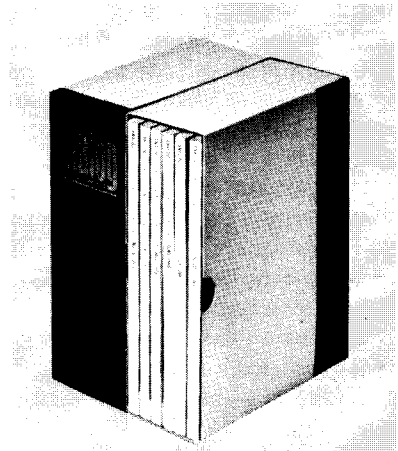
The doctor's puzzled expression deepened. "All right," he acquiesced after a brief hesitation.

The blond man did not release him. "Doc, when you feel rested, forget the conference, go on home and get some sleep. You've done enough for us."

"I—" Kilburn broke off. "O.K.," he said with a shrug. "I will."

Jarrett dropped his hand. He forced himself to turn away as the doctor began walking toward the large double doors. Then spinning around abruptly, Jarrett riveted his eyes on the crowd nearest Kilburn: a diplomat's wife, a member of the Vegan ambassador's party, a helmeted T.C.F. officer, miscellaneous officials. He waited tensely, unable to move until the cadre's agent moved. If he did, Jarrett's mind mocked. If he had overheard the conversation with Kilburn and realized that his adroitly camouflaged weapon must be deployed now—or the cadre's current plan abandoned. And, he thought, sinking his teeth into his lower lip, if I can base my conclusions on the words of two dead Cadosians and an ivory-tower scientist.

He watched Kilburn, still limp-



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ing slightly, approach the doors. The T.C.F. officer he had noticed before, a tall major, passed the physician on an oblique line, reaching casually inside his uniform pocket.

A fragment of thought . . . *if I'm wrong* . . . wisped through Jarrett's head, but his response was instantaneous. Stiffarming an indignant diplomat out of his way, he raised his stunner and fired. The major swayed, crumpling at Kilburn's feet. Kilburn, startled, bent over him.

"Get back!" Jarrett yelled. The note of urgency brought the doctor up short.

"What's wrong?" he queried.

Jarrett hurried to him. "Move away, Doc. I set the charge for light stun, and he's going to wake up." The blond man knelt down.

"But why did you—"

Jarrett withdrew his hand from the major's uniform pocket and held up a micro spray hypodermic syringe.

Kilburn protested, *"That* can't be Medea three tau."

"It isn't. That is the triggering mechanism. *You* are already—"

The major lifted his head, opening pale, colorless eyes. He gazed dispassionately at Jarrett, then at the syringe with sudden comprehension.

"Lie still," Jarrett told him.

The disguised Cadosian propped himself up on his elbows. "I am not mind-blocked," he said tonelessly. His eyes drifted from Jarrett's to contemplate Kilburn. "It is regrettable. We selected him quite carefully."

"And set up all of us, also quite carefully."

The subdirector gave a death's-head smile. "Indeed. However, you forced me into a premature and foolish act. My compliments. Jen chose his allies well."

Kilburn, standing rigidly in place, watched the Cadosian surrounded by four Security guards walk from the concourse to a waiting vehicle outside. As the subdirector left, the doctor blinked, shaking himself. "Jarrett," he said numbly, "what did you mean?"

Jarrett asked, "What?" Suddenly realizing his hands were trembling as reaction hit him, the blond man clasped them behind his back. "You have Medea three tau," he informed Kilburn brusquely. "The cadre gave you the defective infection probably after the aircar accident they arranged."

"Me." His face ashen, Kilburn looked up becoming aware that he was surrounded by the medical team and flanked by many curious high officials. He tried unsuccessfully to stifle the question, "What am I going to do?"

The doctor's six colleagues viewed him with the excitement and enthusiasm they normally lavished on an intricate piece of research. "Alpha Lab II facil-

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ities . . ." "The New Pasteur Institute personnel can . . ." "Notify Ketteridge . . ." "Theoretical inhibition . . ." Taking his arm the scientists, discussing the subject volubly, shepherded a dazed Kilburn through the concourse.

Jarrett listened but made no move to accompany them. With the cadre's plan of sabotage by biological warfare thwarted, the peace negotiations would begin. He decided not to speculate on their outcome or about Kilburn—first a pawn of the cadre, now a problem to be dealt with in a different but equally cold-blooded manner by the researchers. The war's end, a cure for Kilburn . . . both still his concern but no longer his responsibility.

Lips quirking, Jarrett pressed one finger against his throat mike. He did not try to conceal the relief in his voice. "Tell them go ahead," he ordered an agent monitoring communications.

"Attention. Attention, please," the PA system demanded. "Word has been received from the Terran delegates' ship. Temporary repairs have been completed on the drives. ETA planetfall: forty minutes."

"Hey!" A tri-D reporter jogged Jarrett's arm. "What just happened to the T.C.F. officer? What's the story?" He signaled to the camera. "You seem to be—"

"There will be more than enough news here in forty minutes." Jarrett backed away. "Cover the peace conference." ■

IN TIMES TO COME *Next month's cover yarn is by a new author—and the cover is by a familiar artist doing his first Analog cover. The story's by J. B. Clarke—which is not a pen name—and called "Artifact." The cover's by Leo Summers, who's done many a black-and-white ere this.*

Clarke's proposition is quite simple; the familiar theme of the Galactic Federation isn't too probable. Intelligent races get that way by megayears of intense competition with other species—and interstellar flight doesn't automatically remove all competitive drive. And judging from human experience, great-power tensions can make trouble for backward groups—unless said backward group is extremely cautious, clever, and . . . helped.

"Backward" in this case meant Earth, which didn't have interstellar flight. And the Artifact somebody gave them might be a help . . . or bait for a trap. But either way, men had to react quickly. . . .

THE EDITOR

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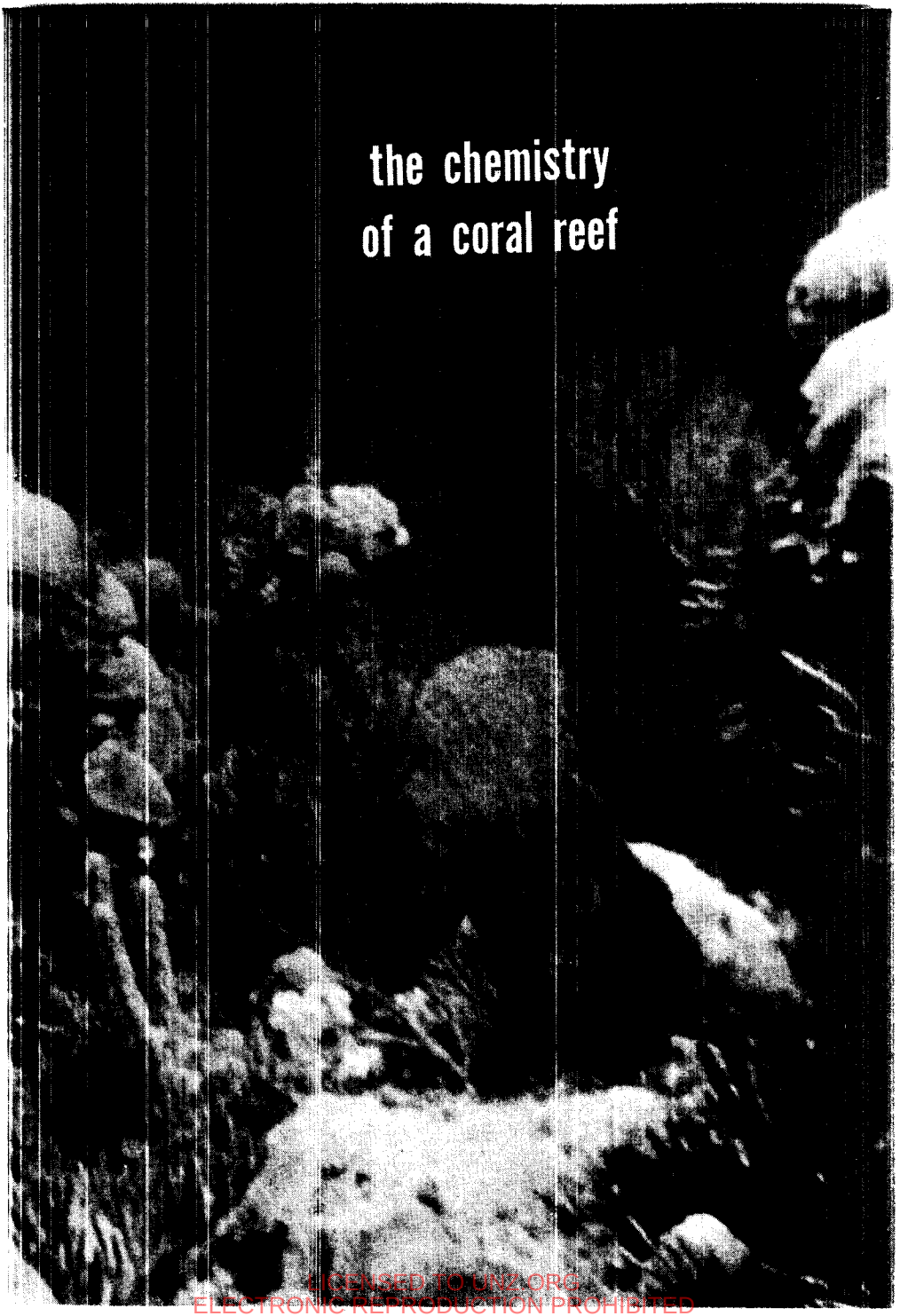
the chemistry of a coral reef



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Man is proud of his vast works—
dams . . . highways . . . bridges—yet nothing Man has ever built
anywhere on Earth can be seen in pictures
taken from orbiting satellites.
But there is a little witless polyp that's changed all Earth. . . .

BY TED THOMAS

It is ironic that one of Nature's smallest creatures, the coral polyp, has produced the largest structure on the face of the Earth, the Great Barrier Reef. The Reef, off the northeast coast of Australia, stretches over twelve hundred miles in length, and its area is larger than that of many nations. Nor is the Great Barrier Reef the only giant structure laid down by the coral polyp. Great beds of limestone in one form or another underlay much of the surface of the Earth, and most of these mark the sites of ancient seas where the coral polyp thrived. Geochemical processes took over where the polyp left off and converted the raw coral limestone to the forms of limestone we now see. Very few limestone beds have resulted from the straight chemical precipitation of calcium carbonate. Most, if not all, of the world's limestone came out of the gullet of the coral polyp and the coralline algae. No living creature, including man, has left such a profound and enduring mark on the face of the Earth as that little blob of jelly in its calcareous shell.

Coral will grow almost anywhere; you can find it in deep, cold water, even at depths of 20,000 feet. It is then always in the form of a small, undistinguished lump. The growing of a coral reef, as opposed to a simple smudge of coral, calls for water having an average temperature of at least about 68 degrees F. You won't get much of a reef even then; it isn't warm enough. That's why the coral reefs of Bermuda are thin, sickly and depauperate. Rich coral reefs with fine branching corals and ponderous masses of brain corals need seawater of about 74 degrees F.

The right temperature alone, however, is only the beginning. There must be a firm bottom for the coral larvae to attach to. Much of the southeastern coast of Florida meets all the requirements for the

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...fish and divin... part-
...men of Bran... coral
...nce Island.

...coral reef except for ... characteristics, and so ... grow.

...requirement is that the ... must move, and it must ... the right velocity. If the ... too slow, insufficient ... and oxygen flow to ... feed the hosts of crea-tures that make it up. If the movement is too fast, the coral larvae are swept away and cannot add to the reef and keep it growing. Rough water breaks up many of the coral structures and may cause a cloudiness in the water that cuts off too much light. Silt may deposit and suffocate the creatures. If the water is deeper than about 150-200 feet, not enough light reaches the corals to allow reef formation.

The salinity must be right. Reefs

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don't grow off the mouths of rivers or in other places where a lot of fresh water runs off the land. So there are a host of conditions that must be met for a reef to start growing, and to continue to grow. Each of the three main kinds of reefs, the barrier reefs, the fringing reefs, and the atoll reefs, has grown as a result of the simultaneous occurrence of literally dozens of major and minor conditions. Yet all of them depend primarily on the coral polyp.

The coral polyp consists of an animal with a jelly-like body surrounded by a calcareous skeleton. Most often the skeleton is reasonably pure calcium carbonate, but sometimes an atom of magnesium slips into the molecular structure to form a magnesium calcium carbonate mineral called dolomite. Each coral polyp is a crude, thick-walled, calcium carbonate cylinder with a hollow down the center that contains the tender body of the animal. The base is solid where it is cemented to the substrate. The hollow space down the center may have projections protruding into it from the outer walls; these are known as septa. The body of the animal is little more than a digestive tract. It has a single opening near the open end of the calcium carbonate cylinder, and the mouth opening is surrounded by tentacles that kick tiny food particles down into the gullet which leads into the main part of the digestive tract. The body also includes thin sheets of tissue called mesenteries that create a few vertical cavities in which the eggs and sperm form. The union of egg and sperm produces the free-swimming coral larvae that float through the water until they settle down to grow their own skeletons.

Larval production is not the only method of coral propagation. Corals can propagate by budding. The physical shape of an individual coral colony depends on the method of budding of that particular kind of coral. As budding takes place, the older and lower corals die and the new ones grow on the old skeletons to form the brain coral, the staghorn coral, the fan coral, or whatever, depending on the species.

Although the corals are the most prolific producers of calcium carbonate on a reef, they are not alone. Calcareous algae soak up the sunshine and convert nutrients to carbohydrates, and when they die their skeletons of calcium carbonate may contribute a mote to the reef. Some of the algae live inside the bodies of the coral polyps in a state of pseudosymbiosis. The polyp releases carbon dioxide, and it excretes nitrogen and phosphorous compounds for the algae, while the algae releases oxygen for the polyp. The relationship is not a true symbiosis because the polyp can live without the algae, although

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not as well. Then, too, when the polyp has been deprived of its normal food, it will simply feed on the algae living within it.

The corals are true animals, and the algae are true plants. Halfway between the two is a group of creatures called flagellates. They get their name from the whiplike arms they use to flail the water for locomotion or to move food to where they can grab it. Some of the flagellates are photosynthetic, and some eat meat like everybody else. They are all tiny creatures, and they, too, may live right inside the body of the coral polyp. When they do, they are known as zooxanthellae. The color of a chunk of living coral may be caused by the presence of these symbiots. A green coral will be loaded with green algae, while a brown or yellow coral will bear the zooxanthellae.

Coral reef chemistry is largely a matter of biology—of the interaction of living creatures. The precipitation or production of limestone from the seawater falls smack into the lap of biology. Much the same is true of another, lesser chemical building block of a coral reef, silica.

The skeletons of some of the algae and some of the zooxanthellae are siliceous instead of calcareous. Many of the sponges have skeletons composed of silica compounds. In fact all sponges have skeletons of one or the other of three compounds: calcium carbonate, silica, or the resilient material known as spongin. The well-known bath sponge is this last type. The other two types would simply slash gashes in your skin if you tried to bathe with them.

The silica in the skeletons of these plants and animals is taken up from the seawater and precipitated in a manner similar to that involving calcium carbonate. When the animal dies its skeleton will often be disintegrated by wave action, but the silica does not go back into solution readily. On the reef the concentration of silica varies more than that of nitrogen or phosphorous compounds due to the high turnover of silicic acid by bacteria and the plankton-feeding animals.

Night and day, the coral reef bustles with active creatures. Their total time is spent resting, eating, mating and producing young. These activities don't really affect the reef much. Parrot fish crunch away at the limestone shell of the corals to get at the polyp, worms bore into the structure, sponges hollow out a nook to grow in, mollusks may nibble around the edges, but no sizable damage occurs to a growing reef. If the reef is a dying reef, these reef inhabitants seem to disappear as fast as the reef itself. The reef always dies due to a change in the environment or in the chemistry of the seawater. Even a reef that has been pounded to pieces by heavy waves from a violent storm can start to grow

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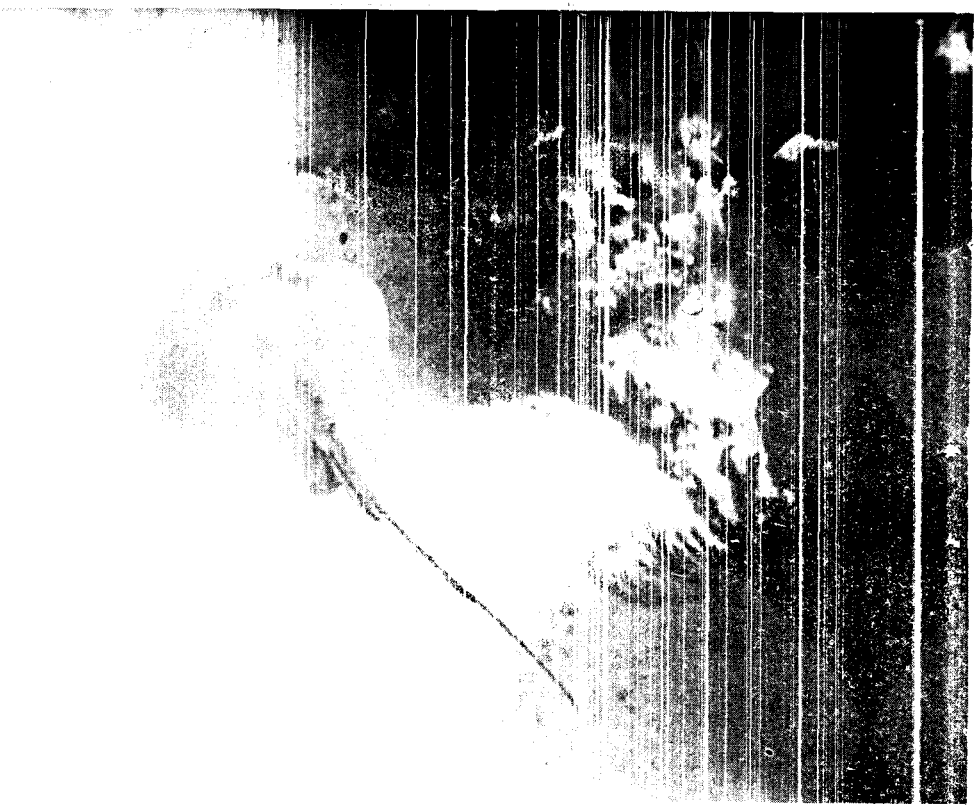

The coral sands at the edge of the reef define a highway for prowlers.

again as soon as the water clears, other conditions remaining right. If conditions are ideal, a coral reef can grow at a rate of three inches a year, but few reach such heady speed. A normal fast rate would be about an inch a year, and most reefs grow at a rate of a fraction of an inch per year.

But the reef cannot grow at all unless the animals that make up the reef grow. Every cubic inch of space occupied by the reef came from the water; all of the reef was once in suspension or solution in a different form. The coral polyps and the algae and the sponges took the materials out of the seawater and made them over into a coral reef. The materials had to be there in the water in the first place, and the water had to be replenished year after year after year. Some of the materials in the water are the structural materials such as the calcium carbonate and the silicon dioxide. If there is any simple phrase that describes a coral reef, that phrase is—calcium carbonate.

All coral reefs in the world are based on calcium carbonate. There must be something in Nature that has a fondness for calcium carbon-

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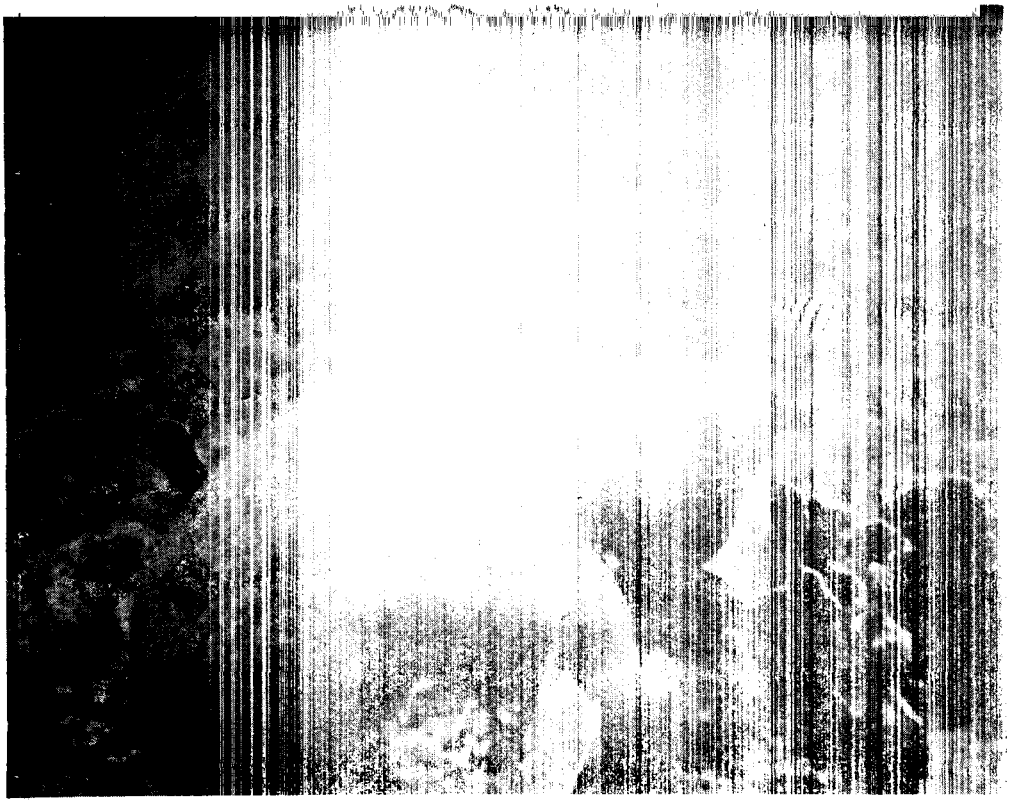

A reef may start with a mass of living brain coral. The coral polyps only coat the surface of the massive corals; the interior is solid calcium carbonate, deposited by preceding generations of polyps.

ate as a structural base. The skeletons of all vertebrates, including man, contain calcium carbonate distributed throughout the calcium phosphate. The external skeletons of mollusks are of quite pure calcium carbonate. When calcium carbonate is in the form of rocks it is called—depending on the crystalline structure and appearance—limestone, travertine, marble, Ice-

[illegible] coral, [illegible] a few other forms.

Calcium carbonate is made up of the three elements, calcium, carbon, and oxygen. The heaviest element of the three is calcium. Calcium itself is a metal, silver-white in color and quite ductile. But it never occurs as a free metal because it reacts so easily with moisture. Calcium metal plus water forms calcium hydroxide and hydrogen gas. Calcium is so reactive—and thus hard to isolate—that it wasn't discovered until 1808. Yet it is the most abundant metal in the human body, the third most abundant metal in vegetation, and the fifth most

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abundant element in the solid portion of the Earth's shell.

Plants and animals living near the surface of the seas take up calcium ions and carbonate ions and synthesize insoluble calcium carbonate. Some of these living creatures take up the soluble calcium carbonate that is already fully formed in the seawater and simply precipitate it. But all is not peaches and cream with the behavior of calcium carbonate. While it is common enough, it has properties few other compounds have. Its behavior puzzled the oceanographers for many years until they were able to define a factor called, "calcium carbonate compensation depth." Here's the situation:

Many of the plankton thriving in the surface waters of the deep ocean have calcium carbonate skeletons. When these pelagic plankton died their skeletons began the long fall toward the bottom. But they never got there. When core samples were taken from the ocean floor in very deep water, there was no sign of calcium carbonate. There was plenty of silica from the plankton that have silica in their skeletons, but no calcium carbonate. For a while the mystery of the disappearing calcium carbonate brought some accusations of careless analyses, but then people began checking properties. They learned that calcium carbonate, unlike most other compounds, became more soluble as the water grew colder. Furthermore, the solubility of calcium carbonate in seawater was related to the amount of carbon dioxide dissolved in the water. The more carbon dioxide, the greater the calcium carbonate solubility. The carbon dioxide concentration increased with increasing depth. Since the seawater also got colder with increasing depth, both factors combined to make calcium carbonate more soluble as the depth of water increased.

The upshot of the whole system is that calcium carbonate forms at the surface and starts for the bottom, but never makes it. It dissolves on the way down. The critical depth below which the solubility of calcium carbonate exceeds the rate of calcium carbonate fallout is known as the, "calcium carbonate compensation depth." In the Pacific Ocean this depth runs about 18,000 feet, while in the Atlantic it is about 22,000 feet. Yet these figures are misleading under the usual conditions that prevail. Most of the time, calcium carbonate will pass entirely into solution within a few hundred feet of the surface. So there is usually an excess of calcium carbonate in the topmost levels of seawater where the light is and where the light-seeking plankton grow. That's probably the reason why some of these phytoplankton have evolved along lines where they simply take up tiny, floating particles of precipitated calcium carbonate and

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lay them down again to form their shells or skeletons.

These properties of calcium carbonate explain why there is such an abundance of calcium carbonate in the shallow, warm waters where the corals grow. And it probably explains why calcium carbonate is the basis of the structure of all coral reefs everywhere.

But the physical chemistry of calcium carbonate is not complete without a glance at the carbon dioxide cycle in the sea and atmosphere. In the atmosphere carbon dioxide is continuously transferred into the biosphere—the mass of living plants—by photosynthesis, and the biosphere emits oxygen. But when the plants die and their tissues oxidize, carbon dioxide passes back to the atmosphere. The breathing of animals and the leakage of volcanoes puts carbon dioxide into the air, too. Air and water meet at the surface of the sea, and carbon dioxide is highly soluble in water. So the carbon dioxide in the atmosphere is in direct contact with the carbon dioxide in the hydrosphere. Depending on the amounts in each, the carbon dioxide will exchange between the two. The carbon dioxide is the means for the transportation of carbon around the world. By means of carbon dioxide, carbon enters the waters and the air, and becomes a part of every living thing everywhere. And it becomes part of the calcium carbonate, soluble and insoluble, that makes up the basic structure of a coral reef.

The oceanographers now realize that a study of the dynamic carbon dioxide cycle calls for an extensive study of the mechanisms and rates of exchange between the reservoirs. It is possible to draw a diagram that roughly illustrates the behavior of carbon dioxide in the sea.

Up near the surface where photosynthesis takes place, and where the calcium carbonate is formed by plants and animals, the dissolved carbon dioxide is removed. To make up the loss, carbon dioxide diffuses into the sea from the air at about the rate it is consumed in the sea. Down deeper, where photosynthesis slows and finally stops, carbon dioxide is no longer consumed. But decomposition of suspended organic matter begins to produce carbon dioxide. Measurements show that the content of carbon dioxide is higher and oxygen lower in the deeper waters. So the deeper waters are very different from the shallow waters in their content of carbon dioxide and oxygen, and in the form in which calcium carbonate is present. These are some of the reasons why carbonate chemistry of seawater is a complicated branch of chemistry, and many phases of it are not understood. The straight chemistry is bad enough, let alone the biochemistry by which the coral animals produce calcium carbonate.

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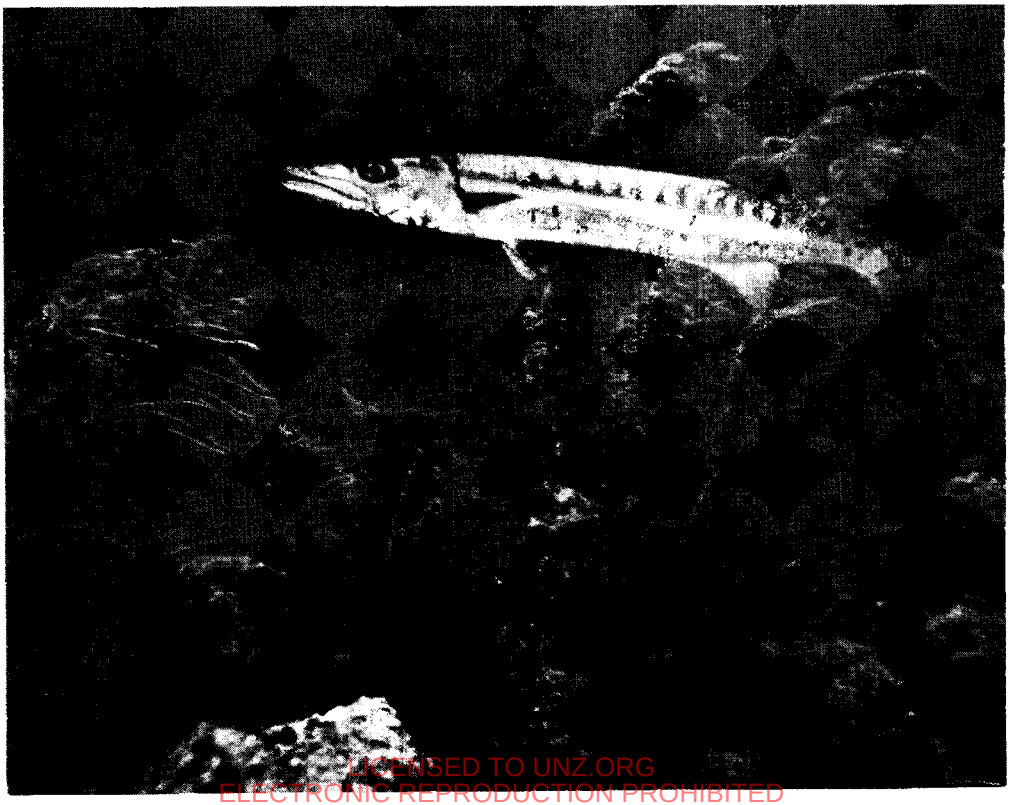
One chemist takes the view that the world's oceans are the result of a gigantic acid-base titration, and he may be right. The strong acids like hydrochloric, sulfuric, and even carbon dioxide have poured out in one way or another from the interior of the Earth. The bases have been released by the weathering of the primary rocks. The titration isn't quite perfect. The ocean has an average pH of 8.2, a bit on the alkaline side; 7.0 is perfectly neutral on the pH scale of 14.

Ocean water has a buffering action. You can add acid to it for a while, and it takes it up before the pH begins to flop over to the acid side. The pH of 8.2 applies only to the open ocean. Whenever large masses of living creatures inhabit a portion of the waters, the pH may change drastically. When the water flows over a coral reef, the pH changes from one spot to another depending on the concentration and type of creatures living right there.

The coral polyps extract the calcium carbonate from the water, and so make it more acid. Many

A frequent visitor to coral reefs, the barracuda is a harmless fish—despite fearsome reputation.



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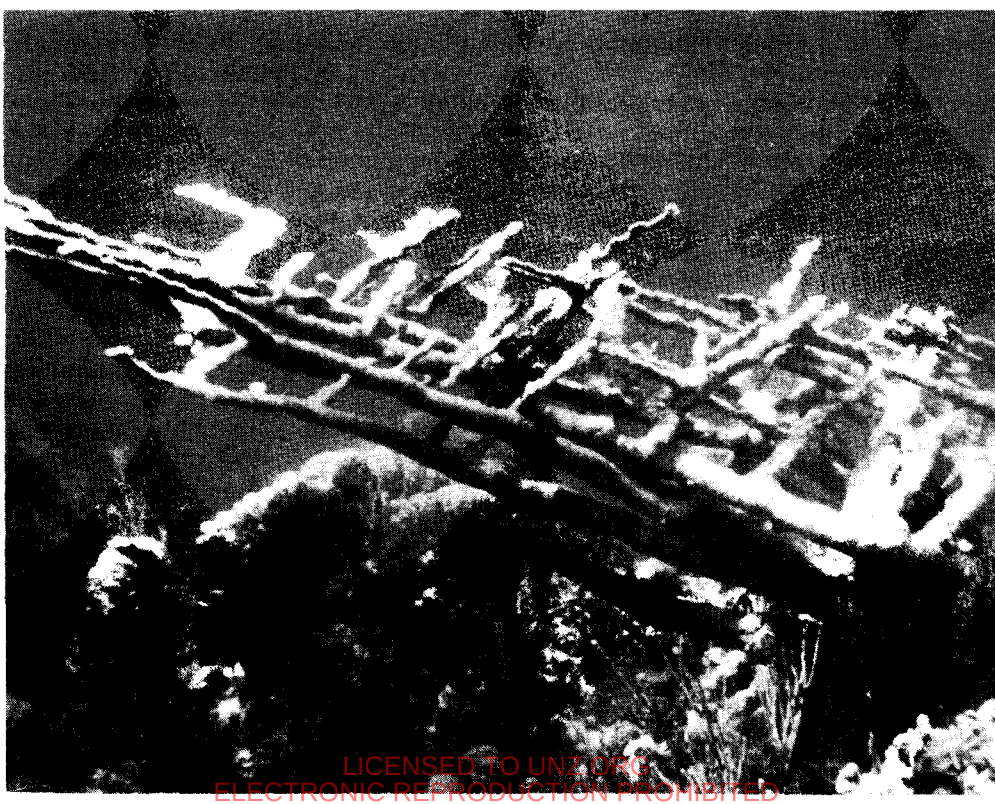
of the excretory products of the tiny animals are nitrogenous compounds such as amines and amides. These make the water more alkaline. The algae remove carbon dioxide, and this, too, makes the water more alkaline. So there is an interplay of acid-base reactions that go in the vicinity of a coral reef due to the biomass, but the overall change in the pH is not very large due to the buffering action.

The chemical composition of seawater has not yet been determined. It is far too complicated. You can't just take up a pot of seawater and analyze it to find out what's there. The act of analysis changes the composition and the state of some of the ingredients. You are confronted with a kind of marine uncertainty principle. When you analyze for, say, magnesium, you change the fluoride content because some of the magnesium is tied up in a magnesium-fluorine complex, and this plays back on the magnesium analysis. All of the ingredients are present in small amounts. Take a liter of seawater and you will find that there are

The depth and flow of seawater condition the shape of some coral species, here and antler coral.



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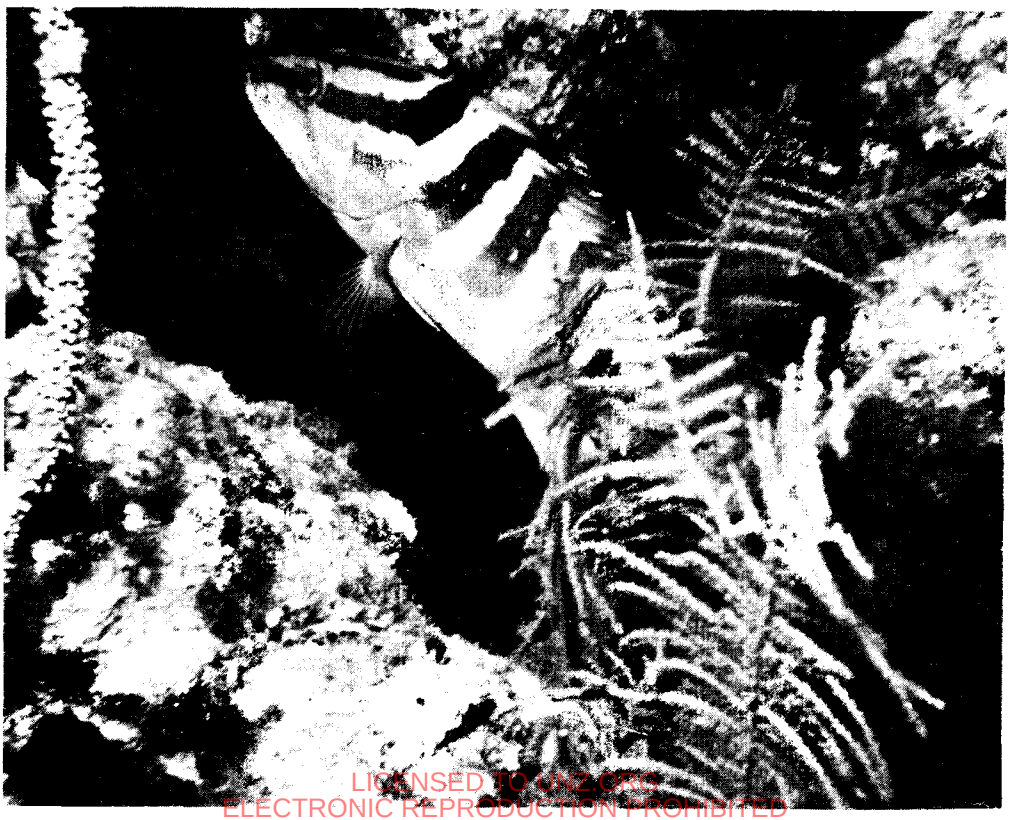
only seventeen ingredients present in amounts greater than 0.01 mole. Silicon and aluminum are probably present in the form of hydroxides, but the hydroxide structure of these and other elements is not yet well defined. These hydroxides are loose agglomerates; they are inorganic polymers that tie up varying amounts of water molecules. The floppy hydroxide molecule will react one way or another depending on how much water is tied into the molecule at the moment.

Chloride ion is always present as the largest constituent; in connection with the sodium and potassium ions there is so much you can taste it. Calcium and iron are both there as ions and as minute combined particles of insoluble material, depending on local conditions. Titanium, sulfur, phosphorous and manganese are the last of the more common elements. The titanium and probably manganese are in the form of those indefinite hydroxides, while the sulfur floats around in solution as a sulfate ion. Phos-

An early stage in the death of a coral reef. Gorgonians, which are non-stony corals, grow on a dead and eroded brain coral. The Nassau grouper will remain as long as there are smaller fish to feed on.



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phorous is in the form of the hydrogen phosphate ion. Nitrogen as a gas makes up the final constituent among the seventeen major constituents. From there on, it is all downhill as far as amounts are concerned. Analysis gets correspondingly harder.

The list of constituents goes on and the amounts grow surprisingly smaller. Once you're through the first seventeen, which themselves don't amount to a great deal, you speak of the amounts of the elements in terms of parts per *billion,* rather than parts per million. The next nine include such well-known elements as zinc, chromium, and barium, along with a few lesser known ones such as rubidium, zirconium, and like that. Many in this group of nine are present as hydroxides.

The next group of nine includes cobalt, nickel, copper and tin, and again they seem to be there in the form of those indefinite hydroxides.

The next group is made up of seven elements with lead, arsenic and germanium making up the better known constituents. Arsenic may be present in the form of the arsenate ion in an amount of about three parts per billion. Many of the seven are hydroxides.

The next to the last group is also made up of seven, including antimony, mercury and uranium. In the whole group antimony seems to be the only hydroxide present.

The final group has five metals in it, and this is where the gold and silver are. There are no hydroxides at all in this group. The gold is present in an amount something like fifteen parts per trillion, and it is there as a complex ion with chlorine. To recover an ounce of gold from seawater you would have to treat about eight billion gallons of water, assuming your treatment was one hundred percent effective. Gold has a present value of about thirty-five dollars an ounce, and you can't even pump that much water across the room for that amount of money.

The listing of the elements makes it seem as if the chemists know what they are talking about when they describe seawater. Things are not by any means that tidy. The amounts and species of the dozen or so elements toward the end of the list have not been clearly identified, and there are grave doubts about what goes on with many of the elements higher up on the list. Take manganese. Analytical results for the amount of manganese vary by a factor of about eighty. What's worse, no one knows with certainty what form the manganese is in. It may be complexed with an organic material. The manganese nodules that form in the deep oceans seem to accrete at a rate of one-hundredth of a millimeter per thousand years. This growth rate makes manganese nod-

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ule buildup the slowest reaction in Nature which is still fast enough to be measured.

Of the host of elements and compounds in seawater, many of them have no known biological function. They make no contribution of any kind to the coral reef, so far as is now known. Gold and silver and lithium are good examples of such metals. At the other end of the extreme, the fixed nitrogen compounds are among the most vital for the creatures that make up the coral reef. The exact compound that makes up the fertilizer will vary, since the nitrogen goes through a complex biological cycle. The nitrates are the end product of the cycle as far as the coral animals and other animals are concerned. In the open ocean the nitrate concentration increases with depth due to the fact that plant life decreases with depth and so does not extract the nitrates. Organic decomposition at greater depths will add nitrates.

Oxygen is present in seawater in many forms, including the oxygen in the water molecule itself. Its most significant form is that of the dissolved gas. Oxygen enrichment occurs at the surface by interchange with the atmosphere, and by release into the water by the plants as the result of photosynthesis. The coral reef benefits from both mechanisms. Without oxygen in the water, all animals die. In deeper water there is a level called the oxygen compensation point. It is the level where respiration of oxygen by animal life just exceeds production of oxygen by plant life.

An important feature of the coral reef is that it is not self-sustaining. Food must constantly be brought to it, transported by the ocean currents. In part the food must be in the form of the phytoplankton—the tiny marine plants that blossom when sunlight strikes rich seawater. In part the food must be nutrients in the form of the soluble and insoluble inorganic compounds that support the phytoplankton that spring up on the reef itself. So the coral reef depends for its ultimate existence on the same supplies that support life everywhere on Earth—the inorganic compounds that allow the plants to grow so the animals can feed on them. In addition to the supply of plankton and nutrients, the reef must be supplied with oxygen for the animals, and with calcium carbonate. If the currents stop, the reef dies.

A coral reef is either growing or dying. The chemical reactions that maintain life must also produce growth. The reef is never simply holding its own. But this is no surprise, for the same is true of all viable organisms doomed to live as a mass of uncoordinated parts. It is the factor of coordination which is, in the final analysis, the only fundamental difference between the coral reefs and the societies of men.

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OPERATION M. I.

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Basically, a human being needs emotional experiences.
A man without emotions either is nuts, or soon gets that way!

R. HAMBLEN

Illustrated by Leo Summers

From: Fleet H.Q., Luna
To: Psychology Division
Subject: Test Flight; Manned Auto-ship
1. Test was failure. Ship emerged on schedule but crew was inoperational.

Addendum:

Dale, you'll have to come up with something better than this. This guy went through the first week and didn't touch a drop. He figured that he'd need it more at the last than at the start, so he saved it. When the ship came out of warp, he was dead drunk. We'll have to come up with something besides a couple of cases of whiskey to make the boredom bearable.

Otto

From: Psychology Division
To: Fleet H.Q., Luna
Subject: Manned Auto-ship
1. We are working out the feasibility of a new idea. Will follow with more information in one week.

Addendum:

Sorry about the whiskey idea, Otto. It seemed hare-brained enough to work. But we've come up with something that can't possibly fail. I'll give you more info when we get the thing worked out.

Dale

From: Fleet H.Q., Luna
To: Psychology Division
Subject: Manned Auto-ship
1. Forward your new plan as soon as possible. The need is urgent.

Addendum:

I hope it's good, Dale. The ship has been checked out and is perfect. But we desperately need some way of manning it. Operational costs are sky-high and having a one-man ship to send on little errands would cut out a big hunk.

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You know the facts already, but we need a one-man ship—it's just too expensive to send a big one when it isn't needed. You have to come up with an idea that will enable one man to take the isolation in warp and arrive at his destination in decent shape.

Otto

From: Psychology Division
To: Fleet H.Q., Luna
Subject: Manned Auto-ship; Operation M. I.
1. Request a list of volunteers and availability schedule for the Auto-ship.

Dale

From: Fleet H.Q., Luna
To: Psychology Division
Subject: Manned Auto-ship; Operation M. I.
1. List and availability schedule enclosed. Request more information.

Addendum:

Hey Dale, what's with the secrecy?

Otto

From: Psychology Division
To: Fleet H.Q., Luna
Subject: Manned Auto-ship
1. Selected individual is Andrew Jurgens, request he report immediately. Will be ready for Operation M.I. two weeks after he reports.

Addendum:

Otto, don't bother asking me what Operation M.I. is. I can't tell you, it's been stuck under ten feet of security wrappings.

Dale

From: Fleet H.Q., Luna
To: Psychology Division
Subject: Volunteer for Manned Auto-ship.
1. Andrew Jurgens will report tomorrow at 1000 hours. Ship will be ready two weeks from that date.

Addendum:

Dale, so go ahead and play games, see if I care.

Otto

From: Fleet H.Q., Luna
To: Psychology Division
Subject: Flight of Manned Auto-ship
1. Blast-off as per schedule. *Striker,* Cruiser Class II, will be waiting at rendezvous point off Sirius.

Addendum:

O.K., Dale, he's off, now how about letting me know what's going on.

Otto

From: Psychology Division
To: Fleet H.Q., Luna
Subject: Auto-ship; flight of
1. Notification received and acknowledged.

Addendum:

Sorry Otto, no can do. Security endeth when It wills, not before.

Dale

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Andy Jurgens stood up and heaved his book at the wall speaker. The room reverberated with the smack of its hitting the wall. He had been sitting and reading, to keep his mind off the three weeks left before the ship broke warp off Sirius. Now that the noise was dying down, Andy could hear the nasal voice that had made him throw the book. The speaker blared out again, "Andrew! It's time for your dinner!"

He walked over to pick up the book, cursing softly at the nasal voice of the computer coming over the speaker. But he didn't curse softly enough. "Andrew! Watch your language!" the computer complained.

"O.K., O.K." Andy said bitterly and wished fervently for some way to get through the armor-plating and at the speaker's circuits.

The computer ran the ship. All Andy had to do was survive the trip, still mentally sound. And that, he was beginning to see, was going to be the real problem. Especially with that computer continually nagging at him like it did.

If it wasn't telling him to straighten out his socks, then it was reminding him of something obvious like it's time to eat. The computer cooked his meals as well as controlling the ship. But the way Andy saw it, that was no excuse for it to be so possessive about them. All the time it was: "Andrew, your dinner is getting cold." Or else: "Andrew, you have to make a log entry in half an hour—don't forget now."

Andy prayed for an opportunity to get at just one of the speakers. "Just one," he thought, "so that I'll have some place where that thing can't holler at me." It wouldn't be so bad if the computer didn't holler. But it didn't know any tone except scream.

Nursing evil thoughts, Andy bent down to pick up the book. It had bounced off the wall and landed halfway across the room. He placed it carefully in the bookcase, in the slot marked for it. Andy had learned very early on the trip that the surest way of getting the speaker to come booming to life was by not putting something away if he wasn't using it. Anything at all, if he so much as left a coffee cup sitting around, the computer's nasal voice would whine over the speaker, "Andrew! Put that cup away!"

He had thrown one cup at the speaker, but only one. The cup had shattered very satisfactorily, smearing coffee all over the wall and showering the room with glass. But the satisfaction had been short-lived. The computer had lectured him on the consequences of a lack of self-control—then it had nagged him until he had scrubbed down the wall and picked up every fragment of glass. The computer could have done it, but as it told Andy, "This will teach

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you a lesson in emotional control." He swore during the entire clean-up job, but he did it silently. The only thing worse than the computer's nagging was one of its lectures on the evils of swearing.

Another week passed. Then in the third week, Andy had a brainstorm. Slyly, he disarranged the tape file and then walked out of the room, with the computer hollering at him to get back in there and straighten it up. He walked away, chuckling, and whistled softly to himself. He was hoping that if it hollered long enough, it would blow a tube or something.

Andy walked into the lounge and picked up a book. Calmly ignoring the blaring voice which had become dulled by constant repetition, he sat down and read, thoroughly enjoying the book—and himself. He was just finishing the first chapter when a shrill screech jolted him upright in the chair, "Andrew!" He waited, but nothing more came out of the speaker. Sighing happily to himself, he settled down once again to the book.

Hunger pains woke him up. He was still sitting in the chair with the book on his lap. He was startled by the quietness and wondered, when he saw the time, why the computer hadn't awakened him for dinner. Then he remembered that last, angry scream. Remorse hit him. the computer couldn't really feel, but still it had certainly sounded hurt. He had, he realized, played a dirty trick. The computer had neatness built into it and there must be a reason for putting it there.

Almost apologetic, he called to the computer, asking if anything was wrong. There was no answer. Andy was starting to get scared. The computer ran the ship, and now he realized that if something went wrong with one part of it, that might affect the rest of the computer. He jumped out of the chair and ran over to the wall by the speaker. Pounding desperately, he tried to get the computer to answer him—but no answer came.

His hand numb from the pounding, he turned from the wall and looked around the room. The carpeted floor, a bookcase on the wall opposite him with the lounge chair placed in front of it, in easy reach of the books, and a desk with a straight-backed chair to his left, all together—a very cozy room. He had never really realized how comfortable it was until now, when the warmness of it was being chilled with a sense of foreboding.

The wall speaker crackled and Andy spun around, staring and hopeful. "Andrew." The nasal voice spoke firmly, as if to a recalcitrant child. "Andrew, you will not get any dinner until you go and straighten up those tapes." Every bit of the room's warmness and the feeling of comfort, vanished. Andy swore vehemently.

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"I've told you before about swearing, Andrew. Just for that, no ice cream tonight!" Andy's eyes rolled and widened—all he could think of was smashing the speaker on the wall, but he had tried *that* before. "Straighten out those tapes, Andrew, or you won't get any dinner tonight!"

Utterly defeated, Andy headed for the tape room, pausing only to clip the door jamb with his shoe. The speaker blared to life when he kicked the door, "Andrew!" "An accident!" he yelled back, "It was an accident!" The voice was silent but Andy seemed to feel an accusing stare centered right between his shoulder blades as he left.

The ship broke warp a week later. Andy had been in the control room, counting the hours. He had been there since the morning, ship time, and would have been there longer except that the computer had made him go to bed.

Now the ports cleared and the star-bright black of space greeted Andy's hungry eyes. The computer was all business now and ignored him completely. Andy felt free for the first time in a month. An hour later, the ship locked onto the cruiser that had been waiting patiently for his arrival. Andy was shuttled over to the big ship and paused in the air lock only long enough to place a purposeful kick on the closed inner-lock door.

From: *Striker,* Cruiser Class II
To: Fleet H.Q., Luna
Subject: Operation M. I.
1. Operation complete success. Subject arrived in perfect health.

From: Fleet H.Q., Luna
To: Psychology Division
Subject: Operation M. I.
1. Report received from *Striker.* Subject in perfect condition. Operation successful.

Addendum:

Come on Dale, break down and tell me how you did it. What was Operation M. I.? I know we'll get an official report but that could take a month to get here. Just let me know how you did it, please.

Otto

From: Psychology Division
To: Fleet H.Q., Luna
Subject: Operation M. I.; success of
1. A complete report will follow after Jurgens has returned and data is processed.

Addendum:

All right, Otto, don't cry. Operation M. I. is Operation Mother Instinct. We simply programmed the computer to act like a mother and conditioned Jurgens to resist authority—namely "Mother." He never even knew he was in isolation. He was too busy fighting against the motherly attentions of the computer.

Dale

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The Analog Counterintelligence Alphabet

During WWII, the use of a phonetic alphabet to make telephone and radio letter-designations clear became familiar—the A for Abel, B for Baker, C, Charlie, et cetera.

There have been modifications for greater clarity still since that time, but the following Alphabet, dedicated to Confusion To The Eavesdropping Enemy is offered by Peggy Wiener Kennedy.

It's incomplete—a few letters missing—and any additional letters, or improvement in the present words, will be appreciated.

The rules are, of course, that the word must begin with the designated letter, must sound like something else when properly pronounced, and must be accepted in the Oxford English Dictionary.

The following counterintelligence Alphabet is offered as a first approximation:

A . . . Aesthete
B . . . Bdellium
C . . . Ctenoid
D . . . Djinn
E . . . Euphony
F . . . Fnese (rhymes with "sneeze")
G . . . Gnomen
H . . . Honor
I . . . Iatrogenic
J . . . Junker, or Juarez
K . . . Knight
L . . . Llama (Spanish pronunciation "1YAma")
M . . . Mnemonics
N . . . None yet
O . . . Oedipus
P . . . Ptarmigan
Q . . . Quiche
R . . . None yet
S . . . None yet
T . . . Tsar
U . . . Urn
V . . . None yet
W . . . Wraith
X . . . Xyster
Y . . . Ypres
Z . . . Zhmud

All additions and/or improvements gratefully accepted in Brass Tacks.

Mrs. Kennedy reports her father, Norbert Wiener, used to refer to the Djinn as "Solomon B. David's best bottled."

THE EDITOR

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persistence

One of the oddest things about fundamental truths is that you can find them if you're sharp enough—even if they're not where you are looking.

JOSEPH P. MARTINO
Illustrated by Kelly Freas

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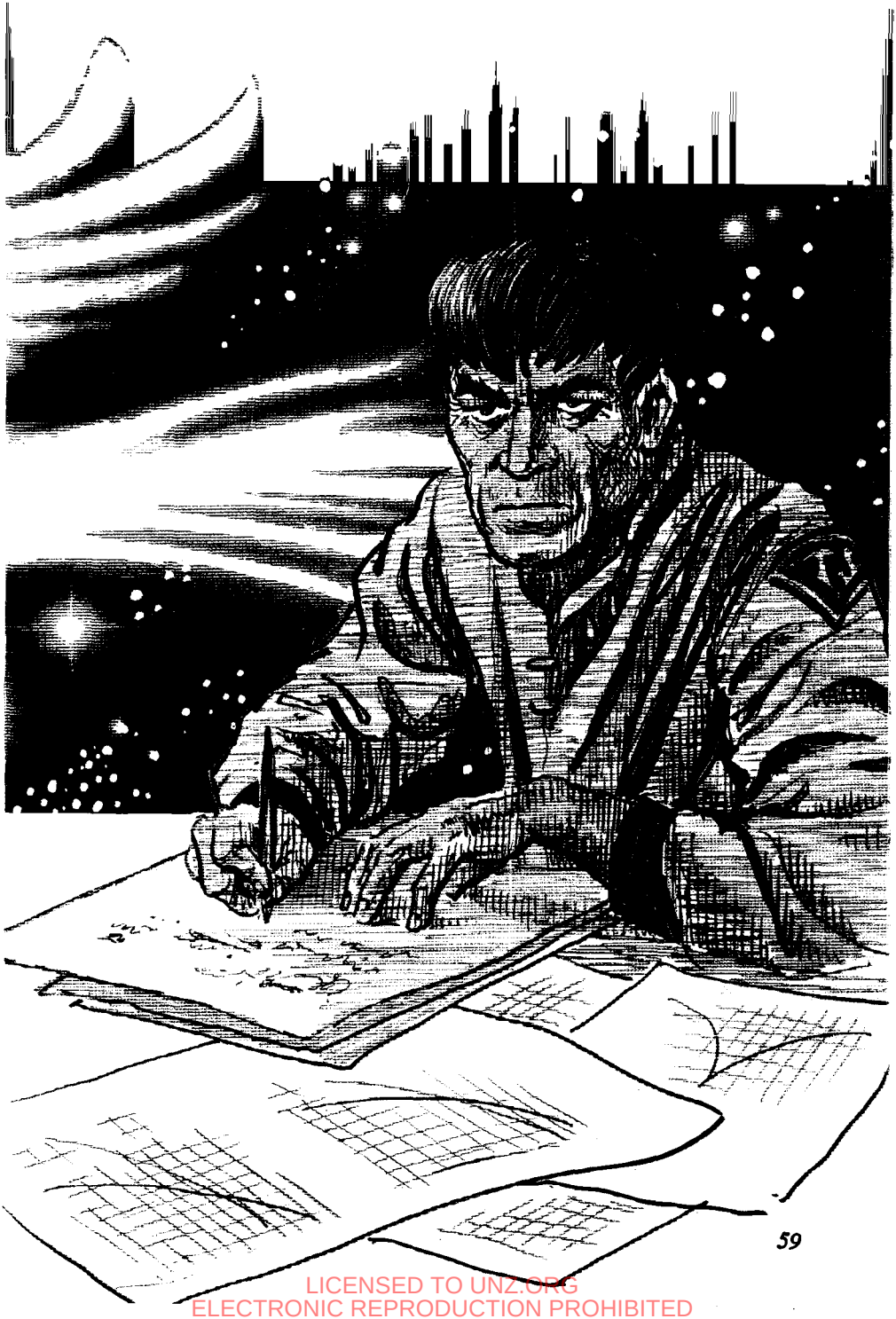

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Commander William Marshall gripped the rope which had been strung through the compartment and swung himself about until the boots of his spacesuit made contact with the floor. He flexed his legs to take up the minute shock of the impact, so that his boots wouldn't bounce away from their contact with the floor.

"Everybody ready?" he called out over his suit radio.

A chorus of affirmative replies came back. With one hand he gripped the rope firmly. The other he moved slowly and cautiously, then placed it over a colored patch on the control console before him. A capacity-operated switch sensed the presence of his hand, and energized a circuit. With breathtaking suddenness, a gravity field existed throughout the interior of the Arcani ship. His suit settled on his shoulders, the breath surged out of his lungs, his back bowed slightly, and his heart raced. Within a few seconds his heart and breathing were back to normal, but the leaden drag of the suit remained.

"This field must be almost one and a half standard gravities," someone called out. "You sure you fixed it right, Bill?"

"How should I know?" Marshall replied. "Half the circuits were shot away, and the Arcani didn't leave any blueprints."

Someone else spoke up. "As I recall from looking at their corpses, the Arcani were pretty short and stocky. They might well have evolved in a field this strong."

"Well, what do we do next?" queried another voice.

"Let's knock off for chow. It's well past midday." The voice was that of Captain Holmes, who was in charge of the technical team which had been studying the captured Arcani spacecraft. "I hated to break for chow when we were so close to testing the artificial gravity, but now that we know it works, let's eat."

"Shall I turn it off?" Marshall asked.

"No, leave it on," was the reply. "If we keep turning it off and on, someone's bound to leave some tools hanging in midair sometime, forgetting that the field is going to be turned back on. Then someone's going to get hurt. Everybody go and eat now, then meet in my office afterwards."

Marshall looked at the rope through the compartment, which for six standard months had aided him in getting about the ship. In free fall, the rope was essential. Now, it ran from floor to ceiling. In this gravity, he told himself, it would be hard to climb even without a suit. It'll have to come down before somebody gets tangled up in it and breaks a leg.

He stepped to the hatch to the next lower compartment. For the first time since he had started working on the ship, he used the ladder which came through the

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hatch. The steps were close together by human standards, but gave him no serious trouble. He went down two more levels, then came to a compartment which had an opening to space, where the hull had been melted away. He strode to the opening, launched himself out, and swallowed hard as his stomach reacted to the sudden return to free fall. Then he used his suit jets to propel himself to the shuttle which would carry the whole team to the satellite station which loomed nearby, hanging above the blue and green ball of the planet Haven. In a short time all hands were accounted for, and the shuttle moved away, threading itself among all the other traffic arriving and departing from the station. Then the shuttle was made fast to the station, an air lock opened, and they all entered. As soon as the compartment behind the lock was pressurized, they stripped off their suits.

"Let's go, Bill," someone said from behind Marshall, as he hung his suit in his locker.

He turned, to see Commander Nikolai Smirnov standing behind him. Evidently Smirnov had already hung up his suit. "Hello, Nikolai, I didn't realize you were aboard today."

"You didn't think I'd miss your test of the artificial gravity, did you? For months I've been looking forward to getting some gravity underfoot. This free fall is not for me."

They left the compartment, strode down a corridor, and opened a door which bore the legend "OFFICERS MESS".

They stepped inside and looked around. "We're later than usual, today," Marshall remarked. "The place is pretty crowded."

"I don't see any empty tables," Nikolai added. "Shall we go to the snack bar instead?"

"Let's wait," Marshall replied. "The turnover in here is pretty fast. We'll get a table soon."

But then he heard a voice call out, "Bill Marshall," and looked for the source. At a nearby table, an officer stood up and waved them over. They hastened to his table.

"Hello, Bill. Good to see you again. Will you join me?"

"Thanks, we will. It's good to see you again, Vladimir." He turned to his companion. "Nikolai, this is Commander Vladimir Sokolnikov, from the Patrol corvette *Rigel*. We served together on the scout ship *Iapetus* years ago. He was commander, and I was exec. And Vladimir, this is Nikolai Smirnov. We were classmates at the Naval Academy on Luna."

The three sat down, and the two newcomers punched their orders on the menu board. Within minutes their food was brought by robot waiters, and they set to work clearing their plates.

"Vladimir, I didn't know you

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were in port now," Marshall said, between bites.

"The *Rigel* just returned from patrol, Bill."

"You have a successful patrol?"

"Not too bad. We bagged one Arcani freighter, and one Arcani Patrol corvette. Detected another corvette, too, but she got away."

"Better luck next time."

"I'm afraid there won't be any next time. When I got in, just a few hours ago, there were two messages waiting for me. The first one notified me of my promotion to Captain, effective immediately. I haven't even had time to get my new insignia. The second one notified me that in view of my promotion I was relieved of command of the *Rigel,* and would be assigned command of a cruiser."

"Well, congratulations. Do you know what ship?"

"Not yet. But I wouldn't have minded staying on the *Rigel* a while longer, even if a captain is supposed to be entitled to a bigger ship."

"I can remember when everyone wanted to get off the Patrol corvettes," Smirnov interjected. "Only about six months or so ago, in fact. They were convinced that going on a patrol was almost a death sentence."

"You're right, it almost was," Sokolnikov replied. "But that was before that professor from New Dubna came out and figured out what the problem was."

"Yes, I remember him," Marshall said. "He spent a few days with us on the captured Arcani ship. He finally gave up hope of learning anything from it, and went back planetside. I heard he'd figured out something, but never got the details. Do you know just what he did?"

"Yes. He went on a patrol with me, after he'd figured it out. It was simple. We had doubled our fleet, and so had the Arcani. So naturally our losses per month quadrupled. Theirs would have, too, except that they figured out a way to get warning when someone was chasing them. With some of the tricks Professor Fedeyev showed us, we figured on reversing the ratio of losses. But it hasn't quite worked out like that."

"Our losses have dropped, haven't they?" Marshall inquired.

"Oh, yes," Sokolnikov assured him. "We lose only one or two Patrol corvettes a month now. But the Arcani should be losing at least sixteen a month, according to the way Fedeyev had things figured out. Only they're not. We're getting only ten or twelve kills a month. That's not bad, of course. They can't keep up an exchange rate like that for long. They'll either have to sue for peace or see their fleet shot out of space. But nevertheless, there's still something wrong. They've got some trick we haven't caught on to yet, or some gadget we don't have."

A thoughtful expression settled

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on Marshall's face, and he lapsed into silence. Sokolnikov and Smirnov carried on the conversation.

"That was Professor Fedeyev, from the University of New Dubna?"

"That's right," Sokolnikov said. "I know some of his family, but I've never met him."

"Oh, you're from New Dubna?"

"Yes, I am. I haven't really spent much time there since I left to go to the Naval Academy, but I still consider it as home."

The conversation continued at the level of small talk. It turned out that Smirnov knew some of Sokolnikov's relatives on New Dubna, and that they had many mutual friends throughout the Navy. Finally they realized how late it was getting.

"I'll have to leave you gentlemen," Sokolnikov said. "I've got to catch a shuttle down to Haven."

"We have to go back planetside, too," Marshall said, "but first we have to meet with the rest of our team. We won't be going down for several hours yet."

"Well, nice seeing you again, Bill. And nice meeting you, Nikolai."

"Nice meeting you, Captain," Smirnov replied.

"And good luck with your new ship," Marshall added.

Smirnov and Marshall slowly walked back to the room where they would meet the rest of their team.

Finally Smirnov broke the silence. "Bill, I haven't known you for all these years without learning how to tell when you've got something on your mind. What is it this time?"

"I'm not sure, Nikolai. Something that Sokolnikov said is bothering me. I've got an idea, but it hasn't jelled yet."

"Well, judging from past experience, you'll worry with it until it does jell. Just let me know if you need help."

They entered the portion of the Station which had been set aside for their team. While most of their work was done in the laboratories and shops down on Haven, it was convenient to have a few small shops at hand, easily available from the ship they were working on. In addition, they needed room for files and records. So several compartments had been converted to electronics shops and machine shops, for light or quickly-needed work. And one large compartment doubled as a place for records storage and an office for Captain Holmes. The walls were covered with photos and sketches of pieces of equipment which had been removed from the Arcani vessel for closer examination.

Captain Holmes finally arrived and called the meeting to order. There didn't begin to be enough chairs in the compartment to seat everyone, so men were seated on

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tables, on top of filing cabinets, and everywhere else they could find room. It helped maintain the atmosphere of informality which Captain Holmes believed was necessary for the success of his team's work. In his estimation, a team composed mainly of senior military officers, most of whom held doctorates in science or engineering from the best Universities on the human-settled worlds, didn't need military discipline. It needed complete freedom of expression, since good ideas were no respecters of military protocol.

Holmes leaned back in his chair, put his feet on his desk, and spoke. "All right, we've got the artificial gravity working, now what should we do next?"

"Let's get some air in the ship," someone spoke up. "Seal off the compartments we'll be working in, and get some air in them, so we won't have to work in spacesuits."

"Would that be safe?" someone else asked. "What about contaminants from the materials in the ship?"

"That ship's been exposed to hard vacuum for six months now," the first speaker replied. "Surely all the chlorine has been outgassed already."

"I'm not thinking just of chlorine. How about the chlorocarbons they must have used as plasticizers and volatiles in their plastics, resins, finishes, paints, and so on?"

"Not to mention the degradation products from the battle-damaged parts," another voice added.

"Don't you think all that stuff has outgassed by now?"

"Maybe it has. But even so, how about the reaction products from the oxygen in our air, and the finishes and other materials on the ship?"

"If those finishes can stand an atmosphere containing, say, twenty percent chlorine, they certainly ought to withstand an atmosphere containing about the same percentage of oxygen."

"Not necessarily. We don't know much about the Arcani body chemistry, but the indications are that water doesn't play the vital role with them it does with us. The water vapor content of their atmosphere is probably vanishingly small. We couldn't possibly keep the relative humidity near zero, not as long as we breathed the stuff. You get some moisture in there, along with the oxygen, and no telling what's going to come boiling out of all those chlorinated compounds in that ship."

"O.K.," Holmes interjected, "it looks like we need to know a lot more before we try to put air into the ship. So what else can we do?"

"Where do we stand now?" Marshall inquired. "I've been so busy with the artificial gravity I haven't had a chance to keep up with the rest of the work."

"Well," Holmes answered, "the

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last major project was the power supply. We had to substitute our own power, since we didn't want to wait until we could reconstruct their generators. So we had to figure out what voltage and frequency their power supply was. In fact, the artificial gravity system provided the first real demonstration that we were right, since the power we're supplying seems to run the system properly."

"I thought we were sure of the power supply when we turned on the ship's lighting system."

"Not really. The lights are luminescent panels. They'll tolerate a lot of deviation from the right frequency and voltage and still work."

"Now that we're pretty sure we've got the right power supply, why don't we start on the electronics?" Nikolai Smirnov asked. "I've been spending the last several months dissecting electronics packages from the damaged parts of the ship. I think we've learned about all we're going to from that approach. It's time we started working with undamaged ones, as parts of complete circuits."

"That's a possibility," Holmes said. He got up and walked to one wall, where a large sectional drawing of the ship was hung. As he spoke, he pointed to the drawing. "There seem to be three main electronics trunks in the ship. We've found that for transferring signals from one part of the ship to another, the Arcani seem to use microwaves and circular wave guides, instead of wires or coaxial cables. Any signal, of any kind, seems to be stuck on a microwave carrier, and piped to its destination. Any idea, Nikolai, whether they transfer the information in analog or digital form, or what kind of modulation they use?"

"None at all, yet. We have the physical construction of the packages pretty well understood, but we haven't started analyzing them from the electrical standpoint yet."

"O.K., so that's one more thing to figure out. Well anyway, there are three of these circular wave guides which run from end to end of the ship." He indicated them on the drawing. "Each one has a big cluster of electronic gadgetry at each end, plus a few packages tapping in at various points in between. In addition, there are a few more wave guides which seem to span just two or three compartments, or which have only one or two packages at each end. A lot of these are going to be things like intercoms, or temperature regulators, and so on. Others are going to be a lot more sophisticated. Judging from the differences we've already found between their technology and ours, these things may be carrying out functions that we can't even imagine yet. Probably the best thing to do would be start with the simpler ones, then move on to the three main trunks when we have the simpler ones figured out."

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"But there are only so many men needed on each of the smaller ones," Smirnov objected. "Some of the simpler ones could probably be handled by one or two men."

"What do you suggest, then?"

"I suggest we put one or two men on each of the simpler ones, and put the rest of us as teams on the three main trunks. There's a lot of preliminary work to be done there in determining the precise frequency of each microwave receiver, and so on. Maybe by the time the simpler ones are figured out, we'll be ready to make use of what's been learned from them in untangling the more complex ones. But there's no point in most of the team standing idle while a few people are working on the simpler trunks."

"That sounds like a reasonable approach," Holmes said. "Any other suggestions?"

"Yes," Marshall spoke up. "I've got an idea of my own that I'd like to follow up on."

"What is it?"

"Well, at lunch I was talking to a friend who has been a Patrol corvette commander. He was saying that the Arcani have something which is keeping our patrols from being as effective as they should be. From my experience on the *Iapetus,* with how patrols are run, it seems to me that the only thing they might have which could do the trick is a C+ radio. I mean, some form of communication which is much faster than a courier ship, and which doesn't involve physical transportation of written documents."

Captain Holmes stood silently for a moment, then spoke slowly. "C+ radio is an old dream, of course. People have talked about it at least since the start of interstellar travel, a century or so ago. Lots of people have worked on it. If any of them had succeeded, he'd have become a wealthy man, a billionaire several times over. But in all that time, no one has come up with an idea that had the slightest chance of working."

"But that's no reason to suppose the Arcani haven't succeeded. As you said yourself, their approach to technology is completely different from ours. Maybe they've thought of something we haven't."

"I suppose that's always possible. But you're going on mighty slim evidence. There might well be many other explanations of their successful evasion of our patrol ships." He paused again. "However, it's too important to ignore. If they have it, we've got to have it, too. O.K., I'll give you a few weeks to work on it. But if you don't show some sort of progress soon, I'll have to take you off of that task, and put you on one of the other ones. Fair enough?"

"Yes, that's fine."

"O.K., that's all for today, then. I'm going to work out the teams

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and their assignments to various tasks. I'll give you your assignments tomorrow morning, in my office down on Haven. See you all then."

The meeting broke up, and the men drifted out of the office in small groups. Smirnov and Marshall walked out together.

Smirnov finally spoke. "Bill, I think you're on a wild-goose chase. C+ radio indeed! With all the people who have been working on it for the last century or so, if it were possible, someone would have done it already."

"Maybe none of them hit on the right approach."

"No, it's more than that. We know quite a bit about physics nowadays. We pretty well know what's possible and what isn't possible. And there's not even the slightest glimmering of a theoretical possibility of C+ radio."

"Remember, until a century ago, there wasn't the slightest glimmering of a theoretical possibility of a material object traveling faster than light, either. Then someone invented the pseudodrive."

"O.K., score one point for you. But I still think you're taking on a hopeless task."

"But remember, I don't have to invent a C+ radio. I suspect the Arcani have one. I have only to verify that suspicion, or prove it false. If we can explain the function of every electronics package on that ship, as being part of something other than a C+ radio, then the issue is settled. Conversely, if I find that some combination of packages is inexplicable except in terms of a C+ radio, then the issue is also settled. Remember, there's something going on which is reducing the effectiveness of our patrols."

"But that's not proof that the Arcani have a C+ radio. However, it's your project, not mine. If you want to waste your time on it, that's your business. And Captain Holmes's business. Maybe you'd better spend a few hours in my lab on Haven, seeing what we've done already with the packages we've been dissecting."

"You're right. I need to catch up on what you've done. Let's grab the next shuttle down."

Marshall and Smirnov showed their passes to the Marine sentry at the gate to the R&D compound at one end of the shipyards. The sentry took the passes, and one after the other, shoved them into the slot on his identification console. They, in turn, placed their hands on a plate on the console, and looked into a retinal pattern scanner. Twice the console, satisfied that the individual described in the pass was the same one who had presented himself, blinked a green light on its front panel. They proceeded through the gate for the short walk to the laboratory building.

"Wonder what that Marine would do if that light ever blinked red?" Smirnov said.

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"Probably drop dead from surprise," Marshall replied. "After all, it's a cinch no Arcani is going to get away with disguising himself as a human and walking through there. And we've never had any significant contact with the Arcani culture at all. It's hard to imagine any human who would want to commit treason, or who could find a way to do it if he did want to."

"True, but this war's going to be over some day. Probably not too far off, either. Then we'll have more extensive contact with them. It's just too bad that we got started off on the wrong foot with the first nonhuman race we met. Once we get the fighting over, we'll have plenty of cultural contact. And we have evidence, from some of the things the Arcani have done, that there are other races out in the galaxy, too. So some day treason is going to be a real possibility. We have to be in practice to cope with it."

"I suppose you're right, but in the meantime it's a nuisance."

They walked across the lawn covered with the broad-leaved green creeper which was Haven's equivalent of grass. They breathed deeply of the oxygen-rich air, and took long strides, with the bounce characteristic of people who had been born and raised under gravity fields stronger than that of Haven. Ahead was the low rectangular concrete box which housed the laboratories and shops which had been assigned to the team working on the captured Arcani ship. Beyond the laboratory, on the horizon, stood row on row of towering ships in the military yards. Beyond them, invisible from here, was a commercial spaceport, and civilian shipyards.

Marshall spoke up. "I believe that ship there is a cruiser. See? Just beyond those three scouts, and to the left of the corvette. Wonder if that's Sokolnikov's ship."

"Could be, but there are probably a dozen cruisers in the yards at any one time, undergoing refitting. I imagine he'll be assigned one of them."

"Probably so. I'll have to get in touch with him and find out which is his ship."

They reached the laboratory building, entered, and turned toward the wing housing the laboratory Smirnov used.

"I don't get down to this end of the building very often," Marshall remarked. "For the last several months, I've spent most of my time in the shops at the other end, rebuilding parts to put the artificial gravity system of that ship back in order."

"Well, let me show you what we've been up to here, then. I'm really pleased with our setup. Not even my lab at the R&D Center back on Terra was this well equipped, at least for this kind of work."

Smirnov opened a door, motioned Marshall inside, then closed

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it after him. He led Marshall to a bench against one wall of the room.

"Here's what we're working with." He picked up a small metal canister, of obviously Arcani manufacture. "These are the electronics packages. They are really monolithic integrated circuits. Occasionally they will use a circuit board with discrete components on it, but generally they just have a big solid block, full of inhomogeneities and discrete domains with tailored interfaces between them. As near as we can tell, they have about two dozen standard types, and they use these in different combinations for different purposes."

"Any idea what they do?"

"Only in the most general sense. The things are packaged in cans, apparently with airtight seals. They have things on them which must be electrical connectors, even though they don't look like any we would use. Even for chlorine-breathers, of course, it's still true that copper is the best readily-available conductor of electricity. But they have to go to more trouble than we do to keep the connectors protected from the atmosphere, all the way from manufacture, through storage, to ultimate disposition. Anyway, there are obviously connectors on them. These carry signals in and out, but we have no idea what kind of signals, nor what they do to the signals as they pass through."

"Some of these packages look damaged."

"That's right. We didn't want to dismantle any of the undamaged apparatus, so I've been working with packages that came from portions of the ship that appeared too badly damaged to be reconstructed. Of course, it doesn't really matter now, since we know that they use only a small number of standard packages. We can cannibalize some of their equipment to replace packages in other places."

"But how have you been examining them? It must be pretty delicate work. Don't you run test signals through, or anything?"

"Here, come into the next room." Smirnov led the way. "This is where we start with each package. I've got an X-ray laser over here. We make a hologram of one of these packages, using X rays. That means, of course, that we have a complete record of both the interior and exterior of the package. Then we blow up the hologram by the ratio of some visible wavelength to the wavelength of the X rays we used."

"Doesn't that make the recording of the hologram fantastically large?"

"It would if we blew up the entire hologram. But remember that any portion of a hologram is equivalent to the whole thing. By taking part of it, the only thing that happens is that we lose some resolution. But for our purposes, we've got all the resolution we need, anyway."

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He went to a cabinet and withdrew a glass plate bearing the characteristic blurry diffraction pattern of a hologram. He positioned this in front of an apparatus which, according to the nameplate on it, was a hologram projector.

"Now look," he said, as he switched the projector on. "Use this eyepiece. It's a low-powered telescope, with a very shallow depth of focus. That way you can look into the virtual image, and concentrate on one portion of it. The portions nearer you, or farther away, are out of focus and invisible."

Marshall seated himself and looked through the eyepiece. At first glance, the image looked like any hologram. It was red in color, and seemed to be composed of bright grains of light drifting through the space in front of him. But the image itself seemed meaningless. There were inexplicable blobs, some with sharp boundaries, others with diffuse regions separating them from adjacent blobs. As he adjusted the focus, he seemed to swim through some of the blobs into others. Finally he turned away from the projector.

"I'm afraid it doesn't mean a thing to me, Nikolai. It's just a bunch of blobs."

"You shouldn't really expect that it would mean anything. Just remember that you're seeing the interior of one of these electronics packages, magnified about a hundred thousand times. With this, we can map individual crystals, and the various other discrete domains within the package. We can also map the pattern of connections from the outside of the package to various parts of the interior."

"But you can't identify what these various domains are, can you? I mean, just mapping their outlines doesn't tell you much about their functions."

"That's right. Now come in here." Smirnov led Marshall through a door opposite the one they had used to enter. "Now in this room we actually dissect the packages. We put them in here," he indicated a bulky hemisphere in the center of the room, "and pump the air out. Then we use a force-plane knife to cut them into thin sections, just a few Angstrom units thick. We have to manipulate them with artificial gravity fields."

"That's a lot of sections for a package ten centimeters or so long, isn't it?"

"It would be, except that we don't have to deal with them all. By making use of the hologram, we can identify interesting sections of the interior, and concentrate on them. Once we've picked out the sections we particularly want to study, we take them in here," and he went through another door into the next room, "and examine them individually. In effect, we carry out chemical analyses of the various portions of the slice. We use soft X-ray fluorescence, electron mi-

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croscopy, field-emission microscopy, neutron activation, and so on. We can really analyze the daylights out of each slice. We end up with a complete description of the atomic and molecular composition of each domain, and the thickness and gradient of each junction."

"Just out of curiosity, how much storage space does your description of one of these packages take?"

"We can get it on about ten reels of computer tape."

"That's considerably bigger than the package itself, isn't it?"

"Right. And of course, we don't carry the description of each individual atom in the package. We describe the boundaries of each homogeneous block, or each graded junction, and then state the composition, or the law governing the variation in composition. If we had to describe each atom, it'd take a roomful of tape at least."

"You have each of the standard packages completely analyzed this way?"

"That's right. That's why I said there was nothing more we could learn this way. From here on out, we'll be learning more about the Arcani manufacturing tolerances than about the packages themselves. We've got to start working with them in operating circuits."

"Can you let me have copies of your tapes?"

"Sure. I'll have them run off and sent to your lab tomorrow."

"Thanks. Now it's getting late, and I'd better get back to my own lab. I want to start going over the physical arrangement of these packages and the various wave guides."

Captain Holmes called the meeting to order. "O.K., men. Let's get this under way. Since everybody's now working on the same kind of problem, I've decided to hold weekly meetings so we can keep each other informed of our progress. Lieutenant Hsing, would you report your progress on the smaller wave-guide systems?"

Lieutenant Hsing slid down from the tabletop where he was seated, and pulled some oscillograms out of a folder. "I'll pass these oscillograms around so you can see them while I'm talking." He went to the wall, and pointed to a portion of the drawing of the ship. "Lieutenant Novikov and I were working on this system here. It consisted of one length of wave guide, with two electronics packages at each end. We found that the power supply for the packages was working, now that we had some power on the ship, and so we measured the bias voltages being supplied to the packages. We decided it would be too hard to work with the things in place, in the ship, so we removed the packages and worked with them in an evacuated laboratory, here in the Station.

"We duplicated the bias voltages the ship had been supplying, and injected various test signals into the

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packages. It took a while, but we worked through all the combinations of connections, and found what the packages were supposed to do. The oscillograms you have show some of the results. We then put the packages back in the ship, and injected some more test signals. We found, as expected, that these signals would be transferred to packages at the other end of the wave guide. However, at this point we don't have any idea what kind of signals the system was intended to transfer. We'll have to identify the apparatus which was connected to the packages. I think our major find has been to determine the proper biasing voltages for these packages."

"O.K., thanks," Holmes responded. "Your next step might be to try to identify the function of that system you were working on, but that would really take you off the electronics work, and put you on analyzing some part of the ship not related to the electronics trunks the rest of the team is working on. We'll decide later what your next move is. Commander Maxwell, how about you?"

Maxwell had been leaning on a file cabinet. He straightened up, but stayed where he was. "My team was working on what had been arbitrarily designated as electronics trunk number one. We found that the wave guide did in fact go from end to end of the ship, and each compartment had at least one electronics package connected to the wave guide. We found that our most fruitful approach was to examine the things connected to the packages. We were able to identify the Arcani equivalent of microphones and speakers, and satisfied ourselves that trunk number one is the ship's intercom. We didn't try operating the system, because we had no idea what voltages ought to be applied to the packages. Now that Lieutenant Hsing has done that for us, we'll check to see if the system—or those parts of it still intact—is in working order."

"Can you get the intercom functioning?" someone voiced the question.

"Not without putting air in the ship."

"What do you figure on doing next?" Holmes asked.

"After we check the electronics packages to see which are in good shape, we'll check the speaker diaphragms to see that they work, and test the microphones with a sound source in an inert atmosphere. That'll be about it. I expect we'll all be available for other tasks by the end of another week."

"Sounds like you've made real progress," Holmes said. "That's encouraging. Now, Commander Shvernik, how are you?"

Shvernik had arrived early enough to get a chair. He stood up in front of it, as though he were afraid to abandon it, and pulled some notes out of his pocket. "My

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team is working on electronics trunk number two. It, too, runs the length of the ship. The compartment which we believe to be the control room has twenty-seven packages connected to the wave guide in it. The engine room has thirty-one packages connected in it. In two other compartments there are six packages apiece connected to the wave guide, and there are four compartments with three packages, and two compartments with one package. Our goal so far has been to catalog the resonant frequencies of each of the stubs leading off the wave guide. We have completed slightly over half this task. When we are finished, we hope to be able to identify pairs of packages, that is, to be able to state which package receives the signal transmitted by a given package."

"That still won't tell us anything about the nature of the signals, or the functions the whole system was supposed to perform, will it?" someone asked.

"That's right. But we believe the trunk is somehow connected with the operation of the ship, judging by the way it connects the control room and the engine room."

"Thank you," Holmes interjected. "And you, Commander Smirnov?"

Smirnov remained seated on a tabletop. "I don't have much to report. My team, working on trunk number three, has even more packages to worry about than does Shvernik's team. We're doing the same thing, and we're about a third of the way through. It'll be another couple of weeks before we've finished, and that still leaves us with knowing only which pairs of packages go together. There's still a lot more to be done after that."

"O.K., both you and Shvernik keep up what you're doing. I'll put Hsing and Novikov on your team, Smirnov, and after another week I'll split Maxwell's team between the two of you. What you're doing is a brute force approach, but it's the only thing we can do for now. Commander Marshall, do you have anything to report?"

Marshall stood up and walked to the ship drawing hung on the wall. "All I've been able to do so far is to try to identify the functions of these various compartments. If the Arcani have a C+ radio, I hope to be able to identify the components of it by elimination of those things which obviously serve other functions, or which are found in compartments where I wouldn't expect to find part of a C+ radio. For instance," he pointed to the drawing, "this seems to have been a bunk room. There would be no reason to assume that the three packages found in this compartment are part of the C+ radio. So I can eliminate them, and also eliminate whatever other packages the various teams find to be associated with them.

"When I'm finished with this examination and elimination of com-

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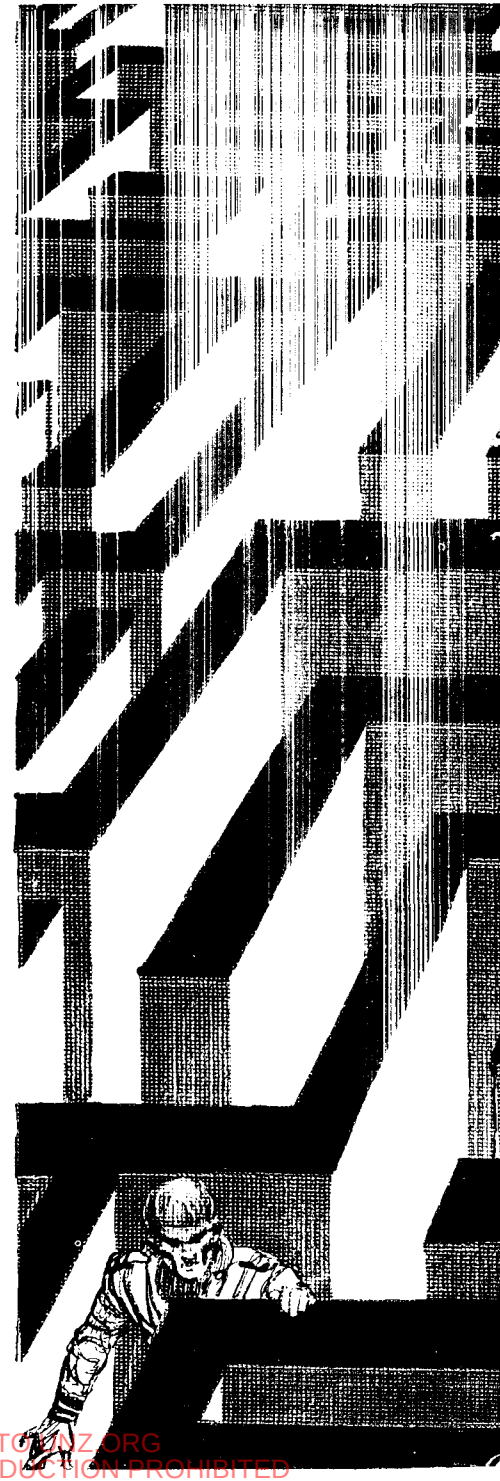
ponents. I can look into the interactions, if any, of the remaining components, for which there is no other functional explanation."

"That really isn't much progress, is it?" Holmes said, almost to himself. He hesitated a moment, then spoke with more firmness. "If you can't show more progress than that, I'm going to have to take you off that task, and put you to work with one of the other teams."

"But that's not fair," Marshall protested. "By and large, the other teams haven't begun to identify the functions of the things they're working on. You can't expect me to outguess them, and identify the parts of the C+ radio when they can't even identify the parts of things so prosaic as engine-room controls."

"That's true enough," Holmes replied, "but you can see how much work the other teams have to do. We're really short of people. I hate to have you working on something as unlikely as a C+ radio, when we need every man we can get on the other tasks."

"I don't consider a C+ radio as particularly unlikely. Look, we do have the anomaly in the number of Patrol corvettes we're killing every month. It's about two thirds of what it ought to be. One way that they could cut down their losses is for a ship under attack, or one which has detected one of our ships chasing it, to use their C+ radio to warn others of where our ships are.



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That way they could avoid our patrols, and keep us from killing as many as we would otherwise."

"I admit that if they had a C+ radio they could cut down their losses. But it's awfully hard to make a case the other way, that because they've cut their losses, they must have a C+ radio. There could be lots of other explanations besides a C+ radio."

"I agree," Marshall persisted, "but I think I can make a stronger case. In a hundred years, humanity has planted permanent colonies on a dozen worlds. We've got settlements on a dozen more, which haven't demonstrated their viability yet. Maybe they'll become permanent colonies, and maybe we'll have to abandon them like we have others in the past. And in addition, we've got maybe two dozen more worlds on which we have some kind of installations, like mines or research bases, but which we're never going to colonize permanently."

"That's true, but what of it?"

"Why, look at the contrast with what we know of the Arcani. Based on captured star charts and so on, we estimate the Arcani have settlements on at least a hundred worlds. They've been a star-faring race far longer than we have."

"Again true, but I don't see your point."

"Just this. A ship can completely traverse the human-explored volume of space in fifteen or twenty days. But it would take ten or fifteen weeks for a ship to traverse the Arcani-settled volume of space. We can manage, after a fashion, to maintain trade and central control over the human-settled worlds, on the basis of courier ships carrying messages. But for the Arcani to organize the volume of space they have, and to hold it together for as long as they have, they must have something faster than courier ships and hand-carried messages."

"How do you know they don't have much faster ships than we do?"

"I don't, except that their warships seem to have performance comparable with our own. For that matter, so do their freighters. Therefore, I think it's safe to assume that their ships, in general, travel at about the same speed ours do."

"And you argue, then, that the existence of a large interstellar empire demands the existence of a C+ radio? Again, it's a weak argument. There might well be other explanations."

"So there might. But here are two arguments supporting the possibility of a C+ radio. I think we can't afford not to pursue it."

"But if there's a C+ radio on that Arcani ship, won't we find it in our normal, methodical examination?"

"If we pursue our methodical approach, it'll be the last thing we find. We won't admit its existence until we understand every last piece of gear on that ship. And it'll be

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years before we reach that point. Can we afford to take that many years?"

"Assuming it's there to be found, we can't afford to wait. But that's a big assumption, and it's based on only the most tenuous reasoning. However, I did agree to give you a reasonable amount of time to look for it, and I won't go back on my word. But you've got to produce something positive soon, or I'll have to put you to work on one of the other tasks. O.K., everybody, that's all for now. We'll meet again here in a week, and I'll check with you individually in the meantime."

"Good morning, Bill."

Commander Marshall placed his index finger on the chart to mark his place, and looked up. "Good morning, Nikolai. What brings you down this way? I don't think we've had the pleasure of a visit from you since we moved in."

"Maybe it's about time I got down here to see what you people are up to. But seriously, I'm curious about how you're coming in your search for a C+ radio. Any results yet?"

"Lots of them, but all negative. So far I'm still eliminating various electronics packages which reasonably appear to have some other function than a C+ radio. For instance, now that we know that trunk number one is the intercom, I can eliminate at one stroke everything connected with it."

"Surely you ought to be able to eliminate most of the packages in one way or another."

"It doesn't turn out that way. A lot of them I can't absolutely eliminate until your team, or one of the others, finds a specific use for them. Take these, for instance," and he wiggled his finger on the chart. "I've been studying this arrangement here in compartment D-4. This compartment appears to be a chart room of some kind. There seem to be maps and other navigational apparatus out on the tables, in the lockers, and so on. Here, over what appears to be a desk, there's a console connected to two electronics packages. Now if they have a C+ radio, these might be associated with a receiver for navigation beacons, or for direction-finders, or something like that. It would be logical to find them in a chart room, wouldn't it?"

"I suppose it would, although I'm learning not to assume that the Arcani use the same logic we do."

"I agree with you there. But anyway, I can't eliminate these two packages yet. So until I find out what they're actually used for, I have to consider them as possible components of a C+ radio."

"How about eliminating everything that's not connected to the outside of the ship in some way?"

"I thought of that, too. But here, let me show you." He fumbled in the desk drawer for a moment, pulled out a pin, and stuck it in the

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chart where his finger had been resting, then got up and walked to the wall. "Look at this," he said as he pointed to a drawing of the ship. "There are at least fifteen structures of some kind, which could be antennas or radiators for some type of emission, located on the outside of the hull. They're all connected to electronics packages inside the ship, which in turn are connected via wave guide to other packages somewhere else. That adds up to a lot of packages right there."

"But still, it helps you eliminate quite a few, doesn't it?"

He shoved his hands in his pockets, and wandered back to his desk as he spoke. "No, it doesn't, really," he said slowly. "The main trouble is that I don't know how their C+ radio works. It may be that it radiates through some kind of antenna on the outside of the hull. Or maybe the whole hull is the radiator. Or maybe the radiating element is located in some compartment in the interior of the ship."

He again sat down in his chair. Smirnov sat on the edge of the desk, drew one knee up, and clasped his arms around it.

"If the radiator is inside the ship, how does the radiation escape?"

"Maybe it doesn't have to go through the hull in order to leave."

"It goes through the fourth dimension, maybe? Or through hyperspace, whatever that is?" Smirnov snorted. "Bill, now I know you're going off the deep end. C+ radio, if it exists, has to obey the same laws of physics as the rest of the universe obeys. In fact, the laws of physics being what they are, I doubt that C+ radio can exist."

"You've said that before. But that doesn't answer my arguments about the Arcani losses, nor about the difficulty of holding together a social system as big as the Arcani have, without something like C+ radio. However, I'm not trying to be a mystic or anything like that. I'm simply saying I don't know enough yet to reject the possibility that a C+ radio doesn't need an antenna on the outside of the ship. Or, if it does have something there, it might not be recognizable as an antenna."

"How could an antenna fail to be recognizable?"

Marshall opened a drawer, pulled out a rolled-up drawing, and spread it out on the desk. "Look at this thing. It looks like a rectangular wave guide, about ten by fifteen centimeters in cross section. It starts in this compartment, in the interior of the ship," he pointed on the chart, "and passes through this bulkhead into the next compartment, just inside the hull. But unfortunately the hull at that point, and most of the compartment, were blown away. We don't know what was on the other end of the wave guide, or whether it penetrated the hull. At the near end, there's what appears to be an electron gun, and farther up the wave guide there's

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an assemblage of deflection plates, coils, loops and what have you, all connected to electronics packages. And one of the packages is also connected to trunk number three. What was the thing? Any idea?"

"How should I know?" Smirnov replied. "Your guess is as good as mine."

"Precisely," Marshall replied. "I don't know what it is either, but I can't rule it out as part of a C+ radio. It simply goes to show that the radiating element might not look like anything we would recognize as an antenna."

"All right, I'll concede your point. But there's one other thing that's bothering me. Suppose you do identify a set of these things as being potentially part of a C+ radio. That is, neither you nor we can identify them as being part of something else. Then what are you going to do? How are you going to determine what the interactions of these packages are? That's going to involve an awfully big experimental program, isn't it?"

Marshall returned the drawing to its drawer, and stood up again. "As a matter of fact, I think I can bypass a lot of the experimental work. Look at this." He went to a cabinet, and pulled out a sheaf of computer-drawn charts.

Smirnov took the charts and fanned through them. "What's this stuff? They look like ordinary characteristic curves for solid-state electronic devices."

"That's right. They are the characteristic curves for one of the Arcani electronics packages. One set of curves for each combination of input and output terminal pairs. Note that you also have gain-frequency curves there for all cases, and in the cases where the transfer characteristic is nonlinear, the nature of the nonlinearity is indicated."

"But this must represent hundreds of hours of experimental data. How'd you get it?"

"Nope. It represents about ten hours of computer time. You remember, you gave me tapes describing the physical and chemical composition of those packages?"

"Yes, I gave them to you the next day, as I promised."

"Right. Well, it occurred to me that by taking into account the quantum mechanical behavior of the semiconductors, junctions, and so on inside those packages, plus Maxwell's equations, the Schrodinger equations, and a few other things, it ought to be possible to compute the behavior of the packages, just as I'd compute the characteristics of a transistor before I built it. The only thing was, I had no idea what the proper biasing voltages on the various contacts were, so I figured I'd have to try thousands of combinations of voltages and see what happened. With most of them, of course, I'd get no useful gain at all. But then Lieutenant Hsing determined what the volt-

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ages should be, and cut the amount of computer time I'd need by about an order of magnitude. So yesterday I finished programming a machine to carry out the computations, and started to work. In less than two weeks, running full time, I should have the characteristics of all the packages computed."

Smirnov stood silently for a moment, then spoke. "Can you let me have a copy of the program?"

"Sure, I can run one off in short order."

"O.K., I've got a computer I can put to work on it, too. That'll cut the total time in half, and make my work a lot easier. In fact, I'm going back to my lab and stop our experimental program. We've already got enough data to verify your computations, and correct the program where it needs correction. Bill, you've just saved me several weeks work."

The second of the weekly progress reviews turned out to be very short. It started with Captain Holmes arriving late, and shedding his uniform jacket as he swept into the room. He tossed the jacket on top of a bookcase, and dropped into his chair.

"Sorry to be late, men. The admiral called me into his office at the last minute. I missed the midday shuttle, and had to catch the next one. In general, he's satisfied with our progress, but would like things speeded up. I told him we were going about as fast as reasonably could be expected, but he still wants results faster. I got the impression he's being pressured from Headquarters, on Terra. I really don't think it means anything, but we don't dare look like we're slacking.

"Well, so much for that. Where do we stand this week? Commander Marshall, I believe your work on the computer analysis of the Arcani electronics packages is worth starting off with."

Marshall stood up in front of the table he'd been sitting on. "I think almost everyone here knows about it, Captain. At one time or another, they've come to me and asked for copies of the computer program. However, I'll run through it briefly, for the benefit of those who might not have the full story." He quickly described the computation procedure he had devised for predicting the characteristics of the electronics packages. "Anybody have any questions?" he finished. There were no questions, and he sat down again.

"O.K.," Captain Holmes went on, "let's get on with the work on the electronics trunks. Commander Shvernik, what's your report?"

Shvernik stood up and walked to the drawing on the wall. "We have finished cataloging the resonant frequencies of all the stubs leading off this wave guide," he said, pointing to the chart. "We are now in a position to begin analyzing the packages connected to these stubs. Mak-

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ing use of the results of Commander Marshall's analysis should enable us to complete this task very quickly. I would estimate that we can have it completed within a week. I suggest that our next move should be to start identifying the apparatus connected to these various packages. That is, we will know what happens to the signals, so we should start identifying the sources of these signals." He stood silently for a moment. There were no comments from anyone, so he returned to his seat.

"Now, how about you?" Holmes said, as he indicated Smirnov.

Smirnov had been seated on a table, with his knees drawn up and his arms clasped around them. He dropped his legs over the edge of the table, and leaned forward, his hands on the tabletop. "We have completed about two thirds of the task of cataloging the frequencies of the electronics packages in trunk number three. If we can keep up at this rate, we should be finished by the end of another week.

"However, rather than wait until we had all the packages cataloged, we have started to make use of Commander Marshall's computer program to analyze the behavior of certain of the electronics packages."

He slid down from the table, walked to the drawing on the wall, and pointed to it. "For instance, here in compartment D-4, which was tentatively identified as a chart room, there were two electronics packages connected to a console. We found that they communicated with a package in the engine room, and one in what appears to be the pilot's compartment. While we haven't been able to identify the precise function of the packages in the other two rooms, we are fairly certain that the two packages in the chart room are repeaters, giving the navigator some information directly from the engine room and the pilot's compartment. Information, perhaps, on ship's speed and heading.

"We expect to continue during the coming week with more analyses of particular packages. When we get all the frequencies cataloged, we will then turn to analyzing the interactions of the packages." With that, he returned to his seat.

Holmes sat silently for a moment, then turned to Commander Marshall. "How about reporting your progress on the C+ radio, now?"

Marshall stood up again. "Most of my progress is still of the negative variety. I've been trying to eliminate various packages from consideration. I think I've been able to identify all those which obviously serve some other function, even if that function can't be identified, and strike them off my list. But from here on out, it will be necessary to wait until the other teams identify specific functions for each package, before I can eliminate them.

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"For instance, I thought there was a strong likelihood that the two packages in compartment D-4 were associated with the C+ radio. However, the work of Commander Smirnov's team has eliminated them from consideration."

"It was your computer program that made it possible, Bill," Smirnov interjected with a grin. "You were hoist by your own petard."

"I'm not complaining, Nikolai. It makes my work simpler if I know that something isn't part of the C+ radio. At any rate, my next move is going to be to set up a computer model involving all the packages still under consideration, including definitions of which packages are paired with which others, on a common frequency, and then analyze the possible interactions of the whole system, using the computer program I described earlier. He leaned back against the table, waiting for Holmes's comments.

"You really haven't made any significant progress since last week, have you? While I did agree to give you a reasonable amount of time, I also expected to see some progress."

"The other teams seem to be going ahead at a reasonable rate. They're not really being hurt by my working on the C+ radio."

"That's true, but I told you the admiral was pressing me for more progress. In fact, one of the questions he asked me was how come I was letting you work on such a ridiculous project, when I needed men so badly on the other projects."

"I'd like ot point out," Marshall rejoined, a trace of asperity in his voice, "that some of the progress made by the team on trunk number three is based on my work, as is the whole program for next week of the team on trunk number two. It's true that I worked out that computer program for my own purposes, but it's proving very valuable to the other tasks. In fact, I would say that my program has speeded them up considerably more than my personal presence on one of the teams would have. I don't really believe you can say that progress has been slowed down by my spending time looking for their C+ radio."

Holmes pulled at his chin with thumb and forefinger for a moment, pursed his lips, then said, "O.K., I have to agree you're right. You have made a big contribution to analyzing that ship. You can keep going a while longer, looking for a C+ radio." He looked around the room. "Anyone have anything else to say? O.K., the meeting's dismissed. See you all next week."

Marshall drifted out of the room with the rest of the men. Smirnov fell in step with him. "Bill, that program of yours is really going to save us all a lot of time. But I wish you'd drop this

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C+ radio kick you're on, and start working on the real problems. You could make an even bigger contribution if you were working directly on the other problems. And you know, the longer you wait to admit there really isn't a C+ radio, the harder it's going to be, and the worse you're going to look."

"Don't worry, Nikolai. I still have my reasons for thinking the Arcani do have a C+ radio, but I'll be ready to drop the notion as soon as I'm shown that there are other explanations for my reasons, or when I'm shown that there's not enough unexplained gear left on that ship to hide a C+ radio."

"Well, I hope so. Anyhow, I'm glad the week's over. I'm looking forward to the weekend."

"Same here. Tomorrow morning Mei-ling and I are going sightseeing. We decided that as long as we're going to spend some time on this planet, we're going to enjoy it. It's a cinch we could never afford to come here as tourists."

"You can say that again. But things have been so busy, Cathy and I haven't had much of a chance to see the place. Maybe we'll just have to make time for it. Your invitation for tomorrow night still holds?"

"Oh, yes, we'll be back in plenty of time. Why don't you come over around eight thirty or so?"

"That sounds good. We'll see you then."

Marshall took another look at himself in the mirror. He decided his dark-blue singlet and kilt were too dull. Informality was all well and good, but there was no reason to be drab about it. He selected a maroon sash, draped it over his right shoulder, and pinned it into place with a plain silver brooch. As he turned away from the mirror, the door annunciator chimed. He glanced at his watch-finger, to see that it was precisely eight thirty.

Mei-ling's voice came from the kitchen. "It's the Smirnovs, darling. Will you let them in? I'm putting the meat in the cooker."

He thought, for the thousandth time, that they simply had to get another viewscreen for the front-door scanner, perhaps in the bedroom. Having only one, in the kitchen, was a bit of a nuisance.

He swung the door open. "Well, hello, Nikolai. And Catherine, it's good to see you. Come on in."

As they stepped inside, Marshall was again struck by the contrast between the two. Both had black hair and black eyes, but Nikolai's Slavic features gave him an air of stolidity. Catherine, on the contrary, seemed to sparkle. Not just her eyes, but her whole face. This seemed to reflect their personalities, too. Nikolai was slow, almost plodding. Catherine was light, almost bubbly. Marshall had decided long ago that they must complement each other. No other explana-

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tion of how they got along made sense. Tonight, however, even Nikolai was dressed informally. He had on a doublet and knee-length shorts, in a light-blue. Catherine was wearing a dark-green chlamys, pinned at the throat with a gold clasp. She slipped this off, and beneath it she had a pale-green sleeveless tunic.

"Let me take your wrap, Cathy. This season the evenings are chilly here, despite the warm days."

"They sure are," added Nikolai. "That's why I decided to wear something with sleeves. It's only a short walk over here, but that's enough to get chilled on an evening like this."

Marshall returned from the closet just as Mei-ling entered the room. Strictly speaking, the cheongsam she wore was more formal than the occasion called for, but on her diminutive form, along with her clearly Chinese features, it seemed completely appropriate.

"Hello, Catherine. And Nikolai. It's so nice you could come."

"Please sit down, everybody," Marshall added. "I'll bring some punch."

A few minutes later he returned, with a tray of glasses, just as Catherine was saying, "Yuri is in college, so he may as well stay on Terra. But we've been thinking of bringing the other two children here when school is over for the year, and enrolling them here for the next term."

"Both Liu and Maria are still in high school," Mei-ling replied, "so we could bring them here, too. Bill and I have talked about it, but we haven't decided yet. They seem to be doing well in boarding school, but we hate to be separated from them for so long. It all depends on how much longer we'll be here on Haven."

"That could be quite a while yet," Marshall said. "There's still an awful lot of that ship to take apart and study."

"They told us, when we were transferred here, that the project would be a short one," Nikolai growled. "Well, that's the way things always turn out. They always take longer than they're supposed to. I guess we can be glad it wasn't a battleship that was captured. Studying one of those would be a lifetime job. Say, Bill, this punch is pretty good. What's in it?"

"It's mainly gin."

"I'm surprised. Normally I'm not fond of gin. On New Dubna, we drink practically nothing but vodka."

"Well, this is a bit out of the ordinary. It's genuine Terran gin. Dutch, in fact. I brought it with me, and I've been hoarding it for some special occasion. But I've never been able to understand you vodka drinkers. There's no flavor to the stuff. You might as well be drinking pure grain alcohol, cut with distilled water."

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"Oh, that's simple. When we settle down to some serious drinking, we don't want a lot of congeners cluttering up the process."

Something chimed softly from the kitchen.

"That's the cooker," Mei-ling said. "The meat's ready."

"Bring your drinks and let's go," Marshall added.

As they passed a low table in the hall, Catherine spotted a faded photograph in a black plastic frame, standing among some more recent pictures.

"That's not Liu, is it?" she asked. "The picture looks too old."

"No, that's I at nine years of age," Marshall told her.

"What's that beside you," Nikolai inquired.

"That's a model of Satellite Station Number Three. They had just put her in a stationary orbit over the South Atlantic the year before. I won second prize in my school's model-making contest with that."

"But what's it made of?"

"Toothpicks. It took me six months to put it together. I had to handle each toothpick with tweezers, and I must have spent a small fortune on glue."

They sat down, and Mei-ling brought the dinner from the kitchen. After they had been served, Nikolai spoke up. "Bill, I'm not surprised to learn about that model you built. It just indicates you've been a persistent character all your life. Just imagine. Spending six months with toothpicks and glue. It'd drive me nuts."

"I don't think of myself as persistent, Nikolai. It's just that everyone else gives up too easily."

"Just like everyone on Luna gave up too quickly on the Grand Labyrinth?"

"What's that?" Mei-ling asked.

"Didn't Bill ever tell you about that?" Nikolai asked. "I always knew he was a modest fellow, but not telling you about that is ridiculous."

"Well, it really wasn't all that important," Marshall interjected. "The Grand Labyrinth was a naturally-occurring complex of caves and tunnels about halfway between Luna City and the Naval Academy. Somebody had closed off all the entrances and pressurized the thing, and made it into a tourist attraction. The Luna City Chamber of Commerce had put up a cash prize for the first person, other than the workers there, who explored every part of the system. It was really just a come-on to impress the tourists with the size of the complex. But I spent about a year, going through the place on weekends and school holidays, and I managed to do it. Actually, I was the first person ever to go into some of the smaller and more remote chambers."

"That was you, Bill?" Catherine exclaimed in surprise. "I remember

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when it happened. Dad came home and told me about how one of the cadets had won the prize, but I never knew it was you. My father," she added, turning to Mei-ling, "was Director of Tourism for Luna City while Bill and Nikolai were cadets."

"Well, anyway, that's all there was to it," Marshall concluded. "It was a challenge I couldn't turn down, but anyone could have done it if they'd wanted to."

A short time later, Mei-ling asked, "Everyone ready for dessert?"

"You bet," Nikolai responded. "The meal was delicious, but I saved some room for dessert."

She returned from the kitchen with a tray full of pastry, and set it in the middle of the table.

"Mei-ling, this is absolutely delicious," Catherine said. "And the crust is so light. How do you do it?"

"The crust is Bill's work," she replied. "I made only the fruit filling."

"Well, Bill," Catherine said, turning to Marshall, "What's the recipe?"

"It's an old Terran recipe. Central European, I believe. But it's not so much the recipe, as the process. You take some pastry dough, put it on a big table, and pat it out paper-thin, using your hands. Then you carefully fold the big sheet of dough in half. Then you fold that in half, and so on, about half a dozen times. Then you pat it out again, and fold it again, and so on. You have to repeat this four or five times. It usually takes at least a couple of hours. But each time, you trap more and more air bubbles between the sheets of dough. So when you bake it, they expand, and it comes out very light and flaky."

"You know, Bill," Nikolai said, "ever since I've known you, I've wondered what you got out of besing so persistent. Now I know. It's delicious pastry. You might even be able to convince me it's worth it."

With dinner finished, they returned to the living room.

"Mei-ling," Catherine asked, "the last time I saw you, you were finishing another collection of poems. Whatever happened with them?"

"My publisher has accepted them. They'll be coming out in a few more months."

"Wonderful. May I have a look at them?"

"I have copies in my study. Do you want to go up there, or shall I bring them down here?"

"Oh, let's go up to your study. The men always end up talking shop anyway. They won't even know we're gone."

"Ready for another drink?" Marshall asked.

Smirnov picked up his glass, swirled the remaining liquid around,

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and then drained it. Then he passed the glass to Marshall. Marshall returned shortly with refilled glasses, and sat down. The two men sipped their drinks for a time, then Smirnov spoke up.

"Bill, don't you think you're carrying this persistence thing too far? I mean, with the C+ radio? Isn't it time you called it quits?"

"I'm not trying to protect a reputation for persistence," Marshall replied, mildly. "I believe there are some things which are easy to explain if the Arcani have a C+ radio. If they have one, it's likely to be installed in their warships, including the one we've captured. It seems only reasonable to look for it."

"But why do you think they have one? What real support do you have for the idea?"

"Well, first of all, there's the matter of their losses. We should be killing about sixteen of their Patrol corvettes every month. But we're not killing anywhere near that many. We're getting about a a dozen a month, instead."

"Where did the number sixteen come from? Why should we be killing that many anyway?"

"You heard what Captain Sokolnikov said when we talked to him."

"True, but that's hardly enough to base your conclusions on."

"In itself, it isn't. But right after we talked to him, I went to the Intelligence staff, and asked where the figure came from. They showed me the computations. Based on the number of ships we have on patrol, the number we believe they have on patrol, the average patrol speed, the radius of detection of both their gravity detectors and ours, and some other things, you can compute that we ought to be killing sixteen a month, on the average. But if those ships which are attacked, or which successfully locate one of our Patrol corvettes, were to broadcast the information to their other ships, they could avoid our patrols. That would cut down the number we find."

"That's fine as far as it goes, Bill, but you didn't keep after the Intelligence people long enough. I visited them yesterday, after the meeting, and they had some new results to show me. Based on plotting the locations of our kills over the last four or five months, they've deduced that the Arcani have adopted a new patrol pattern which is responsible for their reduced loss rate. It's not as effective, since it has cut slightly the number of our transport ships that they've found, but it has helped them reduce their losses. So there goes your argument for a C+ radio. It was nothing but a change in tactics."

"But that's not my only argument. There's also the fact of their immense empire. From the information we have, it's about three

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thousand light-years from end to end. They must have settlements on hundreds of planets, besides the ones we know about."

"And that implies a C+ radio?"

"How else could they manage to govern and administer such a huge social system without rapid communications?"

"The same way we do. Courier ships carrying mail."

"But consider the times involved. We can get a letter from anywhere in our volume of space, to anywhere else, in not more than twenty days. Taking into account stops for refueling, and so forth, it must take them fifteen weeks to get mail from one end of their empire to the other. With that kind of time-lag they couldn't possibly govern the whole thing."

"Oh, nonsense, Bill. Look at Terran history. Take the Portuguese empire, for instance. In the middle of the Sixteenth Century, they were running an empire which extended from Macao, on the China coast, through India and Africa, to Brazil. And they ran it from Lisbon, too. Governors of the various colonies were appointed and removed at the King's pleasure. Administrators were shifted around from one place to another, often from one continent to another. And all this, when the fastest means of travel was by caravel, which took months to get from Portugal to China. Often, because of seasonal winds, a round trip would take a year. If the Sixteenth Century Terrans, with their primitive knowledge of government and organization, and without any computers at all, could run an empire where messages took months to arrive, you can't argue that the Arcani cannot run their empire on the basis of mail ships carrying messages. Now admit it. I've shot that argument down, haven't I?"

"Well, perhaps you have. But look at it from another standpoint. The way the pseudodrive works, the lighter the mass to be propelled, the faster it can go. So why shouldn't we be able to propel photons, with no rest mass, at essentially infinite velocity? I see no theoretical reason against it. It's just that we don't know how to do it."

"Bill, Bill, you're thinking like an electrical engineer."

"What's wrong with that? I am one. It was thinking like an electrical engineer that led me to computing the performance of those Arcani electronics packages, just as I'd do for any human-built device, instead of going through a tedious experimental program."

"I grant you that. But on the question of C+ radio, you'd do better to think like a physicist. Look. How does the pseudodrive work?"

"Well, you generate a Controlled Probability Field which causes each particle in the ship to take a quan-

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tum jump. The quantum jumps are controlled so each particle in the ship moves the same distance, in the same direction, at the same time. Since quantum jumps are instantaneous, this means we can travel over some non-zero distance in zero time."

"Right. And since the particles jump in synchronism, the ship effectively covers that distance as a rigid body. But here's the key point. When the whole ship has jumped, the generator for the Controlled Probability Field has jumped, too, and is ready to put the whole ship, including itself, through another jump. Now how can you do that with photons? You can launch them inside such a field, sure. But as soon as they get outside the field, they drop back to their normal velocity. If you want to keep them going, you have to send the generator with them. And that means you're propelling not only the mass of the photons, but of the generator, power supply, and fuel. In short, you're right back to a small spaceship. It doesn't make sense to talk about giving photons a C+ velocity, because you're not dealing with only the photons. So you see, C+ radio is theoretically impossible. You're wasting time, and risking your reputation on it."

"Excuse me, Nikolai," Catherine said as she entered the room, "but it's getting pretty late. I hate to leave, but I think we'd better."

Smirnov glanced at his watch-finger. "You're right, honey. I hadn't noticed the time."

Marshall retrieved Catherine's chlamys, and saw his two guests to the door.

"Good night, Bill," Catherine said, "we had a very pleasant time. And Mei-ling, the supper was delicious."

"Thank you, Catherine. Good night. We're so glad you came."

"Good night, Mei-ling," Nikolai added. "And Bill, you think about what I said."

"Good night, Nikolai. Good night, Catherine."

As Marshall closed the door, Mei-ling linked her hand through his arm. He turned and looked down at her tiny figure, nearly a foot and a half shorter than himself. As he gazed at the oval face and almond eyes, in their frame of black hair, he told himself again that he was one of the luckiest men alive.

"Is this C+ radio the thing you were telling me about last week?"

"Yes, it is," he replied.

"Why is Nikolai so opposed to you? Is he jealous of you or something?"

"I don't think so. I don't see what he'd have to be jealous about. He's got an outstanding reputation in his own right. His place in the world of physics would be secure if he never did another thing."

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"Then does he have some pet theory you're trying to overturn? Does he have an emotional attachment to some law of nature that you're trying to violate with your C+ radio?"

"I'm not even sure whether a C+ radio would violate any of the laws of nature, as we now understand them, since I don't know how it would work. But even if it did, I can't see that bothering Nikolai. He's always had an open mind about new discoveries."

"Then what's bothering him? You two have been friends since before I met you. Why is he suddenly so upset by this project you're working on?"

"I'll probably never know for sure, darling, but I think he's sincerely trying to save me from my own folly?"

"Is it folly?"

"I don't really know, right now. Up until this evening, I thought I had some strong reasons for believing not only that a C+ radio was possible, but that the Arcani actually had one. He didn't exactly prove I was wrong, but he showed that there were other explanations for the facts I had, which were at least as plausible as my explanation of C+ radio. In addition, he presented a strong argument against the possibility of a C+ radio. He thought his final argument was clinching. I admit I can't see anything wrong with it, but I'm not really convinced. The thing that bothers me is that maybe I'm keeping after this thing for no better reason than stubbornness. Maybe I just hate to admit that I'm wrong, and that Nikolai and all the others are right."

"Wait a minute, darling. I'm thinking back to when I first met you, at the University, on Ganymede. Remember, I had grown up in the Chinese colony there. We were a very close-knit community, with our own culture, going back for generations. I never saw much of the outside world outside our commune. You may find it hard to imagine, but from my sheltered viewpoint, you were glamorous. You were from Terra, itself. On top of that, you were a naval officer. It was enough to overwhelm me. Part of the reason it didn't was that there were a lot of other glamorous off-worlders there, too. The thing that really struck me, about you, was your persistence about everything you did. It wasn't stubbornness, nor was it single-mindedness. It was the nearest thing to my Oriental brand of patience that I'd ever seen in a non-Oriental.

"I'd learned to appreciate patience. When I went to the University everything I'd ever learned, about how I should live my life, seemed to be challenged. Things I'd taken for granted in the commune were suddenly merely parochial folkways. The thing that brought me through the confusion

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was the patience my parents had taught me. I felt that if I just waited, and didn't do anything I couldn't later undo, everything would eventually make sense. And it did. I was grateful to my parents for what they had taught me about being patient, even if they hadn't taught me a lot of other things.

"But anyway, I knew how important patience was, and I was attracted to you because you seemed to have it, too. And you've kept this same persistence, ever since. I don't know anything about physics, or C+ radio, or anything else you work with. But I do know you. If you thought there was a C+ radio, you had good reasons for it. You weren't just being stubborn or difficult. And if you decide there isn't one, it'll be because you have good reasons, not just because there are a lot of other people who don't believe in it, either. I've got enough confidence in you to know that when you consider what you already know, and what you think, and what you've been told by all the others, you'll make the right decision."

He raised his hand and touched her cheek, then smoothed her hair. "Thanks, sweetheart. Sometimes it's hard to know whether I'm as objective about a decision as I like to think I am. But I will give this one some good thought, and I'll consider what Nikolai told me and see how it stacks up with what I already know. Now, it's been a long day. We'd better get some rest."

"Fine. You close up the downstairs while I clear the table."

Marshall arrived early for the next progress meeting. As he entered the room, he was carrying a large metal case, with PROPERTY OF TSN stenciled across its top. He sat down in a chair and placed the case beside him. Soon the room filled up and Captain Holmes got the session started.

"Commander Shvernik, let's hear your report."

Shvernik, who as usual had arrived early enough to get a chair, stood up. "I'm happy to report that we have finished our analysis of trunk number two. We have identified all the interconnections of the electronics packages attached to the trunk, and using Commander Marshall's computer program, have managed to determine what happens to the signals from the time they enter a package connected to the trunk, until they leave the trunk by way of another package. We won't, of course, know what the signals actually are until we identify the functions of the apparatus connected to the packages. However, it's clear that in all cases, the signals are merely modulated onto a carrier for transmission elsewhere in the ship, and at the other end are either demodulated to their original form, or are operated on in some manner for instrumentation purposes. I be-

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lieve that our work is complete, and we are ready to take up some other task."

"Thank you. That certainly is excellent progress. The admiral will be glad to hear of it. And now Commander Smirnov, how about your report?"

Smirnov stood up and walked to the diagram on the wall. "First," he began, "we have completed the task of cataloging the frequencies of all the packages connected to the wave guide. We are now in a position to carry out the analysis that Commander Shvernik has just completed on trunk number two. Depending on how much computer time we can get, we should be finished in two more weeks.

"We have, also, kept up with the program of analyzing portions of the trunk which could be isolated for separate analysis. For instance, here is one item," he pointed at the drawing, "which we have analyzed more or less completely. The device appears to be a wave guide, of rectangular cross section, about ten by fifteen centimeters. At the inboard end, there is an electron gun. However, it seems to be somewhat different from a conventional Terran one. Instead of emitting a thin pencil of electrons, it emits a collimated beam of them, from its whole surface. It's an unheated cathode, using essentially conventional solid state emission. We could build one if we had any use for it. Farther along here is a set of electrodes. They are activated by an electronics package, and set up a complex electric field inside the wave guide. As the field travels down the wave guide with the electron stream, the stream is altered from the simple collimated beam which it started as. Some parts are intensified, by having electrons from other portions diverted. Other parts are weakened, in some cases by having the electrons diverted right out of the stream and to electrodes on the inside of the wave guide. The final condition of the electron stream is that it has a very complex structure.

"Now what does this thing do? The end, unfortunately, was destroyed. But we found a much smaller version of the same thing elsewhere in the ship. The outboard end was covered by a thin sheet of some metallic choride crystals, which was illuminated from inside the wave guide. Where electrons struck the crystal, it became opaque, and blocked the flow of light through it. It was, in short, the Arcani equivalent of a cathode-ray tube. Instead of scanning an electron beam, they have chosen to manipulate the cross section of a whole stream of electrons. This means generating a very complex field inside the wave guide, but it does give them a faster frame rate, if they want to use it. And it's much easier to superimpose images without relative distortion. All in all,

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a very interesting gadget. We have also analyzed a few more items, but I won't go into detail unless someone is particularly interested. We have written descriptions of all our results."

There were a few requests for copies of the reports. Smirnov noted the names of those asking for copies, and then sat down.

Holmes turned to Marshall. "Well, how are you coming? It's clear there's no C+ radio contained in trunk number two, and it looks like trunk number three will be completely analyzed in two more weeks. Do you still want to keep looking for a C+ radio among its components?"

Marshall remained seated. "No," he answered, "I'm no longer convinced that the Arcani have a C+ radio, so there's no point in looking for it."

"So you're ready to admit it's impossible, are you?" Smirnov asked.

Marshall turned to face Smirnov. "Now wait, Nikolai, I didn't say I thought a C+ radio was impossible. I merely said I no longer thought the Arcani had one."

"Then what makes you think it's possible?"

"That's simple. I've got one."

"You've WHAT?"

But Marshall ignored the babel of voices in the room. He stood up, picked up the case, and moved to a table. Three men got down to make way for him. He opened the case, revealing it to contain a communications terminal, with keyboard and printer. He connected a cable from it to a socket on the wall. He punched a coded sequence on the keyboard, and a light on the front panel blinked on.

"Now let's see," he muttered, half to himself. Then louder, "Nikolai, you may remember that Captain Vladimir Sokolnikov was to take command of a cruiser. I learned that he was given the *Ursa Majoris*, which was refitting in the yards down on Haven. Two days ago, he lifted off the planet, and by now should be on station in the War Zone, five or six light-years away. Before he left, he agreed to the installation of a C+ radio on his ship, and he should have had an operator on it, as of the scheduled starting time of this meeting."

His hands flew over the keyboard, and the message tape which was extruded from the slot on the side of the console read: MARSHALL TO URSA MAJORIS FOR SOKOLNIKOV. HOW DO YOU READ ME?

A few seconds later another length of tape came out of the console, with the reply. SOKOLNIKOV TO MARSHALL. YOUR MESSAGE RECEIVED PERFECTLY. HOW AM I COMING THROUGH?

Marshall replied immediately.

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MARSHALL TO SOKOLNIKOV. YOUR MESSAGE RECEIVED CLEARLY. PLEASE STAND BY.

Marshall turned to Smirnov, who was standing beside the console.

"Nikolai, I understand you and Captain Sokolnikov have some mutual friends. Do you want to ask him anything about any of them?"

Smirnov closed his mouth with a snap, and stood silently for a moment. "Yes. If that really is Sokolnikov on the other end of that thing, ask him who is Karl Heilman."

Marshall fingered the keyboard again, and shortly the reply was received. LIEUTENANT KARL HEILMAN WAS COMMUNICATIONS OFFICER ON THE ALGOL WHEN I COMMANDED HER.

At Smirnov's direction, Marshall sent another message. WHAT WAS HIS NICKNAME?

The reply came back. HEILMAN'S NICKNAME WAS "SPEEDY". I NEVER KNEW THE REASON.

"That's right," Smirnov said, a grudging tone in his voice. "Heilman was a cadet when I taught at the Naval Academy ten years ago. He had a reputation for always being the first in the chow line. Bill, how long ago did you serve with Sokolnikov?"

"About fifteen years ago, why?"

"Just checking. Ask him where Anna Bryusov lives."

Marshall sent the message. The reply read: ANNA BRYUSOV IS MY GRANDNIECE, AND LIVES ON NEW DUBNA.

"He told me she's his favorite niece, and she emigrated to New Dubna five years ago. Ask him what town she lives in."

SHE LIVES IN NOVO LENINSK.

"Ask him to describe the park there. I know he's been there once, since she moved there."

THE PARK IS IN THE CENTER OF THE TOWN. IT IS CIRCULAR, FLOWER BEDS AROUND THE EDGES, AND FOUR PATHS LEADING FROM THE FOUR STREETS TO THE CENTER, WHERE THERE IS A STATUE OF ALEXEI LEONOV.

"I remember that statue," Smirnov said.

"You satisfied?" Marshall asked.

"Yes, I am," Smirnov replied with a sigh. "There's no question in my mind that you've got Vladimir Sokolnikov on the other end of that channel. You might be pulling a hoax of some kind, of course. He might actually be sitting in the communications room at the center of the Station. But I know you well enough to know you wouldn't do something like that. Not on a matter this serious."

Marshall sent another message: MARSHALL TO SOKOLNIKOV. THANK YOU FOR TAKING PART IN THE DEMONSTRATION OF THE NEW C+ RADIO.

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WE WILL CALL YOU AGAIN IN FOUR HOURS.

"Why are you going to call him back?" Captain Holmes asked.

"I'm not. But I'm sure the Navy will be interested in what we've got here, and will want to run some experiments."

Marshall shut off his console, unplugged it, and returned to his chair. He said nothing, but simply waited for the reaction.

The hubbub rose to a peak, and Holmes quieted it, then spoke to Marshall.

"You say you're no longer convinced the Arcani have a C+ radio?"

"I can only say that after I figured out how to build one, I looked over their ship to see if there was anything which might perform the same functions mine does. I couldn't find anything."

Smirnov could hold himself in no longer. "Would you tell me, Bill, which law of physics we have to modify, or throw out?"

"So far as I can tell, none."

"But I proved to you that a C+ radio was theoretically impossible. Now that you've got one, some theory will have to go."

Marshall held his hand up. "Wait a minute, Nikolai. I'll get back to your theoretical proof later. First let me explain how the thing works, O.K.?"

"O.K., go ahead."

"Well, as you pointed out, the problem was one of propelling *something* at C+ velocities, and keeping a Controlled Probability Field generator up with it, so that whatever was moving would always have the CPF generator along, to keep it going. In a ship, this is no problem, since the coils and plates which produce the Controlled Probability Field are imbedded in the walls and interior of the ship, as well as in the generator itself. But then it occurred to me that you really didn't need the wires and coils, if you could cause electrons to travel in the required paths, in free space. That is, if you had a cloud of electrons, with the proper internal motions, it would be its own Controlled Probability Field Generator. And the whole cloud would move in the proper direction at C+ velocities. And since there is the inverse relation between the mass being propelled, and the velocity at which it moves, the electron cloud would move at speeds several orders of magnitude faster than even a light scout ship. And of course, you would detect the cloud by its electrostatic field, just as you detect a ship on pseudo-drive by its gravity field."

"But your electron cloud would be unstable. The mutual repulsion of the electrons would break up the necessary structure. How would it last long enough to get anywhere?"

"True, it's unstable. But I'm generating thousand-ampere pulses,

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one microsecond long, which hold together well enough for about ten milliseconds. At the pseudospeed they're traveling, they could get clear across the galaxy before their degree of internal structure decayed to the point where they could no longer maintain a Controlled Probability Field."

"O.K., I see that. That merely puts a practical upper limit on the distance we can transmit, and already that limit is big enough for anything we're going to need for the next several centuries. But one other thing. How do you produce an electron cloud with the complicated internal structure you need?"

"That turned out to be simple. I use a gadget like that Arcani cathode-ray tube. In fact, I had the shops put them together almost exactly like the one in the Arcani ship, except that I used Terran solid state emitters for the cathodes. I also used some Arcani electronics packages to supply the voltages to the deflecting elements inside the wave guide. I didn't have time to design circuits using Terran components, so I designed the circuits using the analysis program for the Arcani electronics packages. So in fact I did get most of the ideas for building the thing right off that ship. The Arcani could build one with their own components, if they knew how."

"Well, Bill, I'm relieved to hear we don't have to overturn all the theories of physics," Smirnov said.

"You know, that's another thing, Nikolai. You said you had given me a theoretical proof that the C+ radio couldn't be built. And I think you really believed that it was a theoretical argument. But when I examined it in detail, later, I found that it wasn't a theoretical argument at all. It was a practical argument. You said, in effect, that if I could project some very light particles, they would indeed go at the necessary speeds, but I couldn't keep a generator up with them. That is, it was all right in theory, but there was no practical way to make it work.

"If you had really given me a theoretical argument against the C+ radio, I'd probably have given up. I'm persistent by nature, but I'm not blindly stubborn. Even if I thought all the theories of all the physicists were wrong, I know I don't have the talent to replace them with sound theories. On the other hand, as an engineer, I make my living converting theories into practice. So Nikolai, there's a lesson here for you—don't ever make the mistake of telling an engineer that something is theoretically O.K., but impractical. You run a high risk of having to eat your words."

He stood up. "Now," he said, "let's get some Navy communications people in here and let them play with this new toy. We've still got an Arcani ship to figure out."■

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the five way secret agent

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Conclusion.
Everyone agreed on the facts—the trouble was they saw five different Truths implied by those facts!

MACK REYNOLDS

Illustrated by Kelly Freas

REX BADER, who sometimes cynically calls himself the last of the private eyes, is contacted in his mini-apartment by TEMPLE NORMAN, who reveals that he has perused Bader's dossier from the National Data Bank and wants to ask him a few questions before possibly employing him.

Bader is obviously living on Negative Income Tax, and Norman wants to know why. Bader tells him that under Meritocracy three things are needed to get ahead: a high I.Q., a good education and—luck. Thus far he has had poor luck, first training himself to be a pilot, only to have flying automated. He next studied subjects on petroleum, only to have nuclear power come in. He then trained himself to be a private investigator only to find that in the checkless-cashless economy of Meritocracy there was practically no crime left.

Satisfied that Rex Bader is still ambitious, Norman takes him to the ultra-swank apartment of FRANCIS ROGET, Chairman of the Board of International Communications, Incorporated, possibly the largest corporation in the world.

Roget reveals that he is affiliated with an organization that believes the national state has become an anachronism, that it can no longer guarantee world peace and prosperity. His group believes that a new world order is required, a world government based on the cosmocorps, the extra-national corporate body, the multinational corporation. The cosmocorps have been growing, he points out, to the point where they presently control practically all industry, communications and transportation.

His group realizes that for such a world government to be practical the Soviet Complex, too, must be involved. They know that there is a Soviet Complex equivalent of the Meritcrat of the West and want to make preliminary contact with them. Roget offers Rex Bader the

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job of making the initial steps for the Eastern and Western Meritcrats to get together.

Rex, pointing out that the governments of both the United States and the Soviet Complex are undoubtedly opposed to such a step toward world government, refuses the job.

He returns home and three days later, while strolling in the park surrounding his high-rise apartment building, is contacted by HARRY and LUIS who introduce him in turn to SOPHIA ANASTASIS who reveals that she, too, has had access to his dossier and that she represents International Diversified Industries, a cosmocorps that is still in the hands of what she calls some of the old families rather than Meritcrats. Her cosmocorps is opposed to the move toward world government, feeling that it will result in their loss of control. She offers Rex a large sum if he will report to her all that happens when he journeys to the Soviet Complex.

When Rex tells her he has not accepted the assignment, she doesn't believe him and goes off in a huff. Harry and Luis attack him and beat him up. He is rescued from them by TAG DERMOTT and JOHN MICKOFF who take him back to the mini-apartment in which he lives.

They reveal that Sophia Anastasis represents the present-day descendants of the Mafia, the Cosa Nostra families, which have become extremely wealthy and legal —on the surface at least. They also tell him that he is requested to come to the Octagon the following day for an appointment with JOHN COOLIDGE, Director of the Inter-American Bureau of Investigation.

His interview with Coolidge is also attended by SENATOR HOOKER and ADMIRAL WESTOVER, two conservatives, and a younger man who is later revealed to be ILYA SIMONOV, Greater Washington head of the Chrezvychainaya Komissiya *and hence of Soviet espionage-counter-espionage in America. Coolidge tells Rex that American and Soviet agents often cooperate in matters of mutual interest. They are cooperating now in an effort to forestall Roget's steps toward world government through the cosmocorps. Coolidge makes much the same offer that Sophia Anastasis did. That is, he wants Rex to report to him any contacts he makes in the Soviet Complex and the names of any Soviet Meritcrats who are involved in the scheming.*

Rex tells him he has not taken the assignment, and is once again disbelieved. Coolidge and the others are convinced that he did accept, since five thousand pseudo-dollars have been transferred by Roget to Bader's credit balance in the National Bank. Simonov tells him that if he will take the double-agent job that the Soviet Complex will also award him handsomely, in addition

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to the sum Coolidge has offered.

Rex still refuses and returns home.

While sitting in an autobar, he is approached by DAVID ZIMMERMAN who turns out to be a representative of a still different group in the Western economy. He amounts to a latter-day syndicalist. That is, his group believes in world government, but it also goes further and believes that the leaders of industry should be elected from the ranks, rather than being appointed from the top down by industry's owners and the top Meritcrats.

Zimmerman also wants to get in touch with his equal numbers in the Soviet Complex, but his group is not well enough off to offer the large sums that the others did. Once again, Rex reveals that he hasn't taken the job, that it looks like suicide to him. And once again he isn't believed. Evidently, Zimmerman, too, has access to his private dossier.

Rex Bader thinks it over and returns to the home of Roget and takes the job. Afterwards, on his way home he is picked up by Dermott and Mickoff and taken to the Octagon again. There he accepts the offer of Coolidge and Simonov, seemingly betraying Roget. He requests that they deposit the money offered him in a numbered account in Switzerland, just as he had his pay from Roget.

Back in his mini-apartment he calls Sophia Anastasis on his TV screen and eventually gets through to her bodyguard, the one named Luis. Luis wants to know what Rex desires with Miss Anastasis.

And Rex says, "Tell her I'm ready to reconsider her offer."

V

In a little more than a month, Rex Bader took a shuttle-copter out to the international jetport, twenty miles off Long Beach and there took the Supersonic to the Eastern Mediterranean jetport floating some fifteen miles off Cannes and Nice. From there he took a shuttle to Genoa, and from there an electro-steamer limousine to Prague. He had never ridden in such swank transport in his life but that was part of his new image.

He had spent a bit more than two weeks of the preceding period boning up on material that Francis Roget wanted to be sure he understood. The communications magnate continued playing his cards very close to chest. Temple Norman handled most of the details of Rex Bader's studies, giving him lists of books, classified ICI publications, clippings and articles. On three occasions Rex was turned over to others for specialized briefing. They were never introduced by name but all were experts on some phase of international political or economic affairs.

He had gotten a clearer picture of what Roget's group wanted. Rex

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Bader was to be the first to make contact with Roget's equal numbers in the Soviet Complex. After this very elementary touching of minds, the exchanges would become more thorough, a *modus operandi* for more sophisticated exchange of ideas decided upon.

Rex Bader wasn't being fooled. Roget was playing it very cool indeed. Rex was expendable. They were throwing him in at these preliminary stages to feel out what dangers might exist. He was undoubtedly going to earn his high pay.

He was with Roget and Temple Norman when the latter handed him an International Credit Card to supplement his ordinary pocket phone cum credit and identity card.

Rex said, "Just how far does this expense account of mine stretch?"

The ICI magnate said, "It is completely elastic, my dear Bader. The elements which you are expected to contact exist on the highest planes in the Soviet Complex. You could hardly go in as a tourist traveling Thrift Class. You will conduct yourself as a wealthy American, staying at the best hotels, eating in the best restaurants, taking the advice of the sommeliers on the best vintages."

"O.K. It sounds great," Rex said. "However, how did I achieve this opulence so quickly? If your opponents have the same ability to delve into my dossier as you seem to have, then they'll find that my income usually consists of Negative Income Tax."

"We have gotten around that. A large amount has been deposited to your account. Supposedly, a legacy from your father, the late Professor Bader."

Rex said dryly, "My father left me a few hundred books, two or three family heirlooms and some used clothing. Dad had a predeliction for donating his all to lost causes. When he died, he was strapped. I sold the books to help my way through school."

Temple Norman put in, "It was not difficult to arrange. Supposedly it was a trust fund which you were unable to touch until your reached your present age. For all practical purposes, you have unlimited funds. Pray remember that we have access to the National Banking Computers. Any purchases such as mink coats, Rembrandt masterpieces, or diamond rings will immediately be made note of and the credit transfer disallowed."

Rex Bader looked at him.

Roget said, waggling a finger negatively at his underlying, "That will be all, my dear Temple. We're trusting Mr. Bader all the way down the line. Quibbling about expenses is hardly called for." He turned back to Rex. "Briefly, the situation is this. We have dropped a word here and there with our Soviet colleagues at international

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conferences. Everything very careful, of course. No place is so secret-police ridden as a conference between the West and the Soviet Complex. One must be circumspect, indeed. However, treading with the utmost care, we have made the arrangements for you to go in and discuss in more detail the possibility of cooperation."

Rex Bader shifted in his chair. "This is one thing that doesn't get through to me. I can see your cosmocorps possibly taking over through all of the West, in large countries and small. But to cross over the Iron Curtain?"

Roget shook a finger at him. "That Iron Curtain, Bader, began to rust shortly after it first dropped. The international corporate body is a natural functional institution and it can be kept from its role only if there is no extensive industrial development. For half a century and more you have been able to pick up a telephone and in moments call anyone you wished, in Budapest, Pinsk, Belgrade, Leningrad, or anywhere else throughout the Soviet countries. The first cosmocorps to invade the communist lands went into Yugoslavia, such corporations as Volkswagen and Fiat built factories there. Bulgaria was the first to let in Coca Cola, back in 1967. Russia herself succumbed about the same time when, at long last, she decided to build automobiles on a mass scale. Fiat came in to build the plant. American airlines began to land at Moscow then, too. But above all, my dear Bader, communications. In the old days, the Soviet authorities attempted to jam radio reception but with the coming of the satellite communications system, every home in the Soviet Complex can listen to any television broadcast it wishes. The most remote settlement in Tannu Tuva, Siberia, can watch American, Greek, or Argentine broadcasts with the local language dubbed in by the translator computers."

Rex shrugged. "I suppose you're right. It might take time but, if ultra-industrialization is going to blanket the world, Russia and China, too, ultimately will come in. So how do I contact these friends-to-be of yours?"

Francis Roget tapped his fingertips together. "You don't."

Rex looked at him questioningly.

"They contact you. You go first to Prague and conduct yourself as any well-to-do tourist, making his first trip into the Soviet Complex. You do all the things that any other tourist would do. They contact you."

"Then what do I do?"

"You have no iron instructions from this end, my dear Bader. You go where they tell you to, listen to what they have to say. Eventually, you return and report."

"No reporting by standard communications, eh?"

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"That's right. Everything verbal."

"How do I know the good guys from the bad guys? How do we make contact?"

"The code word to identify those who you will contact will be Byron. To acknowledge, you will return the code word Shelley. This is absolutely secure. The only three persons in the United States familiar with this identification code are in this room right now."

Rex Bader spent a good portion of his time for the following week being checked out by John Coolidge and Colonel Ilya Simonov.

At his final meeting with them, Coolidge said, "It is just possible, Bader, that we might have occasion to contact you while you are in the Soviet Complex. In which case, our man will utilize a code similar to your present one but on his saying *Shelley,* you will reply with *Keats."*

Rex was surprised. "I didn't tell you about those code words. Didn't think there was any particular reason to."

The wolfish Ilya Simonov gruffed out a chuckle.

Coolidge said, a touch of smugness in his voice, "Rex Bader, after all I *am* director of the Inter-American Bureau of Investigation."

Rex looked at the Soviet colonel. "The way I understood it, everybody was going to keep hands off until I return. If your agents flock around, you might very easily blow the whole thing. These people aren't chumps and they have at their command the resources to pull off just about anything."

Simonov nodded. "You'll see none of our men, Bader. We won't even tap your communications. I'm fully aware of the fact that if we attempted to, the information might get back to the men with whom you are making preliminary contact. We'll remain far, far in the background. The new code words are only for some ultimate emergency which I am convinced will never arise."

"O.K. He says Shelley and I say Keats, and that tips me off that I'm on contact with your people."

Coolidge said, "Ah, one other thing. I am giving your pocket phone a Priority Two in the National Data Banks."

Rex frowned. "Priority Two?"

"Possibly you weren't aware of the system. The average citizen has a Priority Four. He can tap the data banks for ordinary material, for books from the library banks, for various information relative to everyday life. Priority Three is for specialized citizens such as, say, doctors, who can scan anyone's medical records in line of work, or police officers, who can check your criminal record in line of duty. Priority Two, which you now hold, enables you to delve into the data banks on any level save the top-most security material, such as military and so forth. That, of

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course, is Priority One and only a handful of men in the entire nation hold it."

"O.K.," Rex nodded. "Offhand, I can't image the need for my dipping into the data banks any further than the average citizen, but I suppose something might come up."

He spent one session with Sophia Anastasis, driving about in her car, far out in the countryside.

They sat in the back, Harry and Luis, up front, seemingly not hearing.

The beauteous Sophia had little to say that was new. Her assignment was simple. She wanted, upon his return, to have a complete list of all Soviet citizens with whom he made contact. She wanted to know any arrangements made for further meetings between the Soviet heads and Roget's group. She wanted to know just how amenable the Soviet industrial managers were to Roget's suggestions for a world government based on the cosmocorps.

And she wound it up with, "Oh, just one more thing. International Diversified Industries already has a few agents in the Soviet Complex, for what purposes you need not know. It is remotely possible that something might arise that would make it desirable for us to get in touch with you. If so, we'll continue the same basic code you already have, except he'll say *Keats* and you will return with *Coleridge.*"

He was staring at her in disbelief. "How did you know that code?" he demanded.

Up in front, Luis grunted amusement.

He had hardly gotten back to his mini-apartment before the phone screen buzzed. He sat down in his comfort chair and activated it. David Zimmerman's Nordic face faded in, cheerful as ever.

Rex Bader said, "What do you want? I'm surprised that you'd take the chance of having your call monitored."

"It's not being monitored," Zimmerman said agreeably.

"How do you know?"

"I know."

"Well, what do you want?"

"Leaving tomorrow, eh?"

"How did you know?"

The other ignored that. He said, "We're in no position to pay you for services rendered, Bader. However, if there's any change in mind, on your part, we'd appreciate finding out what you discover over there. There's a remote possibility that one or more of our people . . ."

"Oh *no,*" Rex began to protest.

". . . Might get in touch with you. If so, the same code system you already have, but he'll say . . ."

"I know," Rex snarled. "Robert Burns."

The other's eyebrows went up. "How did you know?"

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"Cause he's practically the only one left!" Rex snapped and flicked off the set.

He stared at the screen in disbelief. This whole thing was developing into a farce. Roget wanted him to make an ultra-hush-hush trip into the Soviet Complex to contact his equal numbers with the eventual aim of creating a world government based on the international corporations. Sophia Anastasis, of International Diversified Industries, thought such a world government would upset the status quo to the detriment of what was once called the Mafia, and wanted all details. John Coolidge and his group were afraid such changes would upset the governmental bureaucracy and the military machine and wanted to prevent it from happening. Colonel Simonov felt the same from the Soviet viewpoint, and wanted to maintain the status quo. Dave Zimmerman was all in favor of world government but wanted the Meritocracy which would run it to be elected from the bottom up in each corporation, rather than being appointed.

And every damned one of them thought that their part of the operation was a secret.

He put his pocket phone into his standard model TV screen and said, "Priority Two. I want the dossier of David Zimmermen, Identity Number 10-KL-224-200." He thought that was right. He had memorized the number back when he had taken the phone from Zimmerman in the car.

It was right. The dossier flashed on the screen. He could have taken the information on his pocket phone, of course, but this larger screen was more comfortable for detailed print such as this.

He ran his eyes down the material. More or less standard. I.Q. of 138, educated in one of the better technological schools, graduated with honors. Computer specialist.

Oh, oh. Several mysteries were solved. Friend Dave Zimmerman was a technician working in the National Data Banks in Denver. He undoubtedly had access to the banks and access to means of bugging and checking on who was being bugged. He was sitting in the catbird seat, in any such matters.

He came, eventually, to criminal record. Zimmerman's criminal record was on the sparse side. He had signed a few peace petitions back during the Asian War. He had participated in some anti-war demonstrations and once had been arrested in a riot. Case dismissed. No mention about subversive activities. Rex wondered. Zimmerman evidently had ample access to the data banks, could he have wiped out any such information? Or, on the other hand, was it possible that the IABI had additional information not to be found in the data banks? Rex Bader had no way of knowing.

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Next was Sophia Anastasis. Her dossier was also largely surprise free. I.Q. of 132. Age forty-two. She certainly didn't look it. Educated at one of the better girls schools and later a business course at one of the older universities. Doctor's degree, no less. She was a member of the Board of International Diversified Industries, but there was nothing in the dossier to explain her duties. Criminal record? None whatsoever, not even a traffic violation. At the end of the dossier he came upon his one surprise. Additional information, Priority One.

He tried Francis Roget and Temple Norman, in turn, and came up with little information that hadn't been available to him on his former Priority Four basis. All very neat, all very standard. High I.Q.s, the best of educations. Spectacular business careers. Criminal records, nil.

Rex grunted and wondered about Luis and Harry, Sophia Anastasis's bodyguards, or secretaries, or whatever they were; probably a combination of both. He didn't know their last names or identity numbers and couldn't think of any manner in which to get them. Not that it was important.

He sat there for a long time, and finally said into the screen, "The dossier of John Coolidge, Director of the Inter-American Bureau of Investigation."

Tag Dermott's face faded onto the screen and he grinned sour reproach. "Rex, Rex," he said. "Naughty, naughty. That's Priority One information."

Rex shrugged ruefully. "I just wondered how far this Priority Two rating of mine would take me."

"It doesn't take you that far, chum-pal," Dermott said. The IABI agent's face faded from the screen.

Just for the dutch of it, Rex Bader said, "The dossier of Tag Dermott, IABI agent."

A robot voice said, "No information recorded. Further data please. What is the Identity Number?"

Rex grunted, "Damn if I know. And I have a sneaking suspicion that I couldn't find out very easily."

He thought about it for a while and then said, "Colonel Ilya Simonov of the *Chrezvychainaya Komissiya.* His dossier, please."

He had expected to be thwarted here, too, but instead ran into the most extensive material thus far. The National Data Banks had considerably more information on Ilya Simonov than on any of the others Rex had checked upon. It had his life down to an almost day by day report.

Aside from the standard data on background, I.Q., age, education and all the rest of it, it also revealed such little items as the fact that the colonel held the Soviet Hero's Combat Award, which as

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Rex had read was about as easily come by as the British Victoria Cross, the German Pour le Merit, the American Medal of Honor. Politicians and chairborne military do not receive such decorations. You earn them the hard way. Ilya Simonov had earned his the hard way. Rex was also interested to see that the other had participated in the Olympics at one time, winning a bronze metal for fencing, a silver one for pistols and another bronze for rifle marksmanship. He was, no doubt about it, one very tough customer. Rex winced to see the number of espionage agents, counter-revolutionists and other Soviet enemies of the state whose lives were credited to Ilya Simonov. The colonel was a one-man plague. He also evidently held all but carte blanche from the upper levels of the Soviet high command.

It behooved Rex Bader not to tread on Simonov's toes, and the trouble was that was exactly what he had planned to do.

His orders were to go to Prague and make like a very well-to-do American tourist. Very well, he was in Prague, for the first time in his life behind the Iron Curtain, now largely rusted through according to Francis Roget. Some years before he had taken a standard tourist trip to Western Europe, the usual London, Paris, Rome sort of thing but Czechoslovakia he found was considerably different.

He had dialed his limousine through to the New Jalta hotel, on *Vaclavske Namesti* which translated into Wenceslas Square and which was obviously the center of town. His suite came as a pleasant surprise, the rooms were high, the furniture avoided the ultramodern with which he was familiar back home. He got the impression that the Czechs, at least, were deliberately hanging onto the arts and traditions of yesteryear. There was even a reception desk and a live clerk in the lobby. Hotels were largely automated in the West and especially in North America.

By the time he had got settled in, it was time for luncheon and he considered momentarily dialing his noonday meal and having it here in the hotel. But no. His orders were to circulate around. He was to be contacted. He doubted if any of those persons Roget wanted him to meet would show up in his hotel room.

He went on down to the lobby and approached the desk clerk.

Rex said, "You speak English." More of a statement than a question.

The other said in impeccable English, "Comrade Bader, in this day and age anyone who has been to school for all practical reasons speaks English. Perhaps it was not the best language to pick for an international tongue, but, then, nobody deliberately picked it."

Rex looked at him, scowling.

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The clerk laughed softly. "It was a great joke on the Russians, but the trend had started too far back for them to buck it. First the British, with the largest and most widely spread empire the world has seen. Then the Americans with the largest financial and business empire the world had seen. During the Hitler War, with the rapid growth in both shipping and air travel, some international language had to be utilized, for landing instructions, for radio communication, for ships coming in and out of ports. So English was chosen, as the language already most widely spread. That meant that every airplane pilot, every radioman, had to study it. Every ship's captain, and his deck officers for that matter. Every port official, be he Russian or Greek, Brazilian or Chinese. So English became a compulsory subject in the schools of every nation."

Rex grunted amusement. "I suppose you're right, at that. I was reading the other day that when Sweden, Norway and Denmark amalgamated their airlines into the Scandinavian Airlines System they had to decide on a common language for plane crews and airport officials to use. What did they pick? Neither Norwegian, Swedish nor Danish. They picked English. O.K., so anyone with any education at all can speak English these days. So, what's the best restaurant in town?"

The Czech receptionist said smoothly, "The one in this hotel, of course, Comrade Bader."

Rex said. "Fine. But I don't feel like eating in the hotel this afternoon. What's the next best?"

The clerk said, "You might try the *Valdstejnska Hospoda.* That translates into Waldstein Tavern. It's at Tomasska 20—an old inn and wine cellar. Very picturesque, Comrade."

"O.K. Do your cabs take instructions in English?"

"But of course. We are not barbarians, Comrade Bader. Also any other language for all practical purposes. Our auto-cabs are fully integrated with the data banks and translation computers. Just as in your own country."

"Well, call me a cab then, will you please?"

The cab had scooted up to the hotel before Rex Bader had even emerged from the place. The door opened and he stepped inside.

"The Waldstein Tavern, at Tomasska 20," he said.

"Yes, Comrade," a robot voice said.

He looked about the cab. It was not quite so shiny and ornate as its equal number in the West might have been. Like the hotel, it seemed to cling slightly to yesteryear.

Rex said, "I don't seem to see a payment slot where I can submit my International Credit Card."

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A robot voice said, "Transportation is free in the Soviet Complex, Comrade."

Rex was taken aback. "It is? Why?" That last had come out inadvertently.

That question took longer to answer. When it came it was in a somewhat different voice and a more human one. "Because it was found to be more economical not to have to go through all the computing. It allowed more easily for the automation of practically all transport in the Complex."

It took Bader only moments to see where that could be true. Back home, the transportation companies were gigantic in size and well integrated, but they were still privately owned and depended upon making a profit. The computer work must have been fabulous. A short hop in an auto-bus in the underground ultra-expressways, an expenditure of less than a single pseudo-dollar, had to be deducted from his credit account and accredited to that of the transport company. And the company probably handled a multi-million such fares a day. What the devil would have happened in the post-industrial world if the computer hadn't come along just when it did?

The Waldstein Tavern was everything that the reception clerk had said it would be, and more like a museum to Rex Bader's eyes than the auto-cafeterias of the pseudo-cities of the West. There were even live waiters. Rex Bader could hardly remember when he had last been served by a live waiter. Not that swank and ostentatious eateries didn't exist back home, but they were for the Meritcrats and the old rich, not for citizens on Negative Income Tax.

He looked about the place. He was one of the very few to be eating alone. Evidently the Czechs enjoyed their food and their companionship. At least, all seemed laughing and chatting and wolfing down monstrous portions of food that looked and smelled superlative.

He could see no one who looked as though he might come up and say, from the side of his mouth, "Byron forever," or whatever. Rex shrugged. It was their top, they could start spinning it any time they wanted. At least he didn't have to worry about being picked up by the police. The police undoubtedly were aware of him but they figured he was on their side.

When asked, the waiter, who was dressed in dark suit with a white apron about his middle and reminded Rex of a character actor doing a waiter's part in the Gay Nineties, recommended various Bohemian and Slovak dishes.

Rex sighed, completely out of his depth, and said, "I'll leave it to you."

"Very good, Comrade. And wine?"

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At this time of the day? Rex shrugged again. What the hell, it was all on Roget's ICI. Why not live it up? He left the wine to the waiter as well.

The food turned out to be some sort of game. Deer probably, Rex decided, although he had eaten deer exactly once before in his life. It came as a well-boiled slab, drowned in a thick, rich gravy and was accompanied by large dough dumplings, dubbed *knedliky* by the waiter, and *zeli* which turned out to be red cabbage.

The wine, according to the bottle, came from Bratislava, was a Reisling, and, Rex Bader was convinced, was made of grapes. It had never occurred to him that wine in the Soviet Complex was actually made from grapes these days. Were their laboratories that far behind those of the West? Did they devote valuable acreage to vineyards in this age? Were they out of their minds? However, it tasted delicious. It came to Rex Bader that while such potables as whiskey, vodka, rum and gin might be better concocted in modern laboratories and factories than the originals, that possibly it didn't apply to wine.

It didn't apply to beer, either, as he was to find later.

They didn't contact him that day, and they didn't contact him that week.

To his mind, his cover was beginning to look a bit silly. Prague was a beautiful town, a veritable museum of a town. He liked Prague fine. He liked the food, he liked the drink, he liked the entertainment, much less of which was canned than at home. He also liked the girls. Especially the Germanic Brunhild he had picked up at the *Vikarka,* a night spot at the Prague Castle. His first impression was that she was probably a police agent with orders to check him out, but not his second. He realized, eventually, that she was, as the old expression had it, a fallen woman. He was moderately surprised. He had thought that fallen ladies were supposedly nonexistent in the Soviet Complex. He wasn't particularly interested in her ultimate offerings, but he was interested in her way of life. How did one pay off a fallen lady in this age of cashless-checkless credit exchange, international as well as otherwise?

It turned out that you paid off with gifts. A girl on the Soviet equivalent of NIT had no difficulties with food, clothing and shelter, nor with medical care and such necessities. But the luxuries, in the lands of the Soviets, as well as in the West, came high. Rex bought her a comparatively inexpensive fur stole in one of the more swank shops on upper *Vaclavske Namesi.* As he did so, he wondered dryly what Temple Norman was going to think about the bill when it came through the computers. Well, the

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hell with Temple Norman. Part of Rex Bader's assignment was to get the feeling of these countries. O.K., he was getting the feeling.

The thing was, Prague was on the staid side. That is, so far as a supposed bachelor tourist, particularly a young and wealthy one, was concerned. All right, he went to Hradcany Castle, once the seat of the Bohemian kings, now a museum. He wandered around the old square, taking Tri-Di snapshots of such famed tourist attractions as the old town clock. He went through the old-old synagogue in the former Jewish ghetto and looked up aghast at the thousands upon thousands of names inscribed on the walls, the names of Jewish victims of the Hitler period. He took some photos of the St. Vitus Gothic Cathedral where most of the Czech kings were buried. Big deal. But what wealthy young bachelor in his right mind would stay a whole week in this atmosphere?

On the eighth day, he was reaching. The alleged tourist attractions were giving out. He had eaten in all the top restaurants, got reasonably smashed in most of the nightspots and beer halls. No contact. He had one or two more places he could visit in line of being a tourist. The most suitable would seem to be *U Fleku* which was described in the tourist literature as being an old tavern that first began to make its smoked

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black beer in the year 1499. Evidently the owner had run into competition with the monks who ran the *U Sv. Tomase* and thought they were the only ones who could really make smoked black beer. The brothers decided the owner of the *U Fleku* was a disciple of the devil. It didn't seem to set him back too badly. Both taverns were still in operation.

Rex Bader had never heard of smoked black beer.

He found that smoked black beer was precious stuff indeed, as compared to the ultra-light, weakish brew that prevailed in the land of his birth. It came in pint-size ceramic mugs, distributed by buxom young ladies in the peasant skirts of the Bohemian past. They put a saucer in front of you and slapped a mug of brew on it and marked the saucer with a pencil. Each time one of the busy young ladies spotted that your mug was empty, she slipped the empty off and slid a full one after it, and gave your saucer another pencil mark. Evidently, when you got to the point when you could no longer slug down black smoked beer, one of the girls came around, totaled up your bill from the pencil marks and you paid off.

At the *U Fleku* you sat out in an enormous courtyard at enormous tables made of lumber yea thick and obviously running back centuries in age. The tables sat at least twenty apiece and most of them were shared, and packed. Some accommodated solitaries, such as Rex; some were romantic twosomes; some were pairs or trios of men, out to get swacked; some were parties of any number; some were family groups, including babes in arms. It made for a lot of yelling, a lot of swilling, a lot of laughter and quite a bit of song.

It was as they used to say, on the picturesque side. There was even a four-piece Bohemian band, banging away in great ardor and complete in native costume of a century and more ago.

Rex was charmed. But, for that matter, he had been getting charmed for the past week. His first impression had been that the Czechs were far, far behind the West. He was beginning to suspect that they were ahead. It didn't particularly matter that this town was medieval in appearance, as compared to the pseudo-cities of the States. That in the city proper, at least, there were few indeed of the high-rise apartment buildings that would contain two thousand and more apartments and be all but self-sufficient in ultra-stores, theaters and other entertainment. They didn't have the shine here, but, what was the German word? *Gemutlich?* Something like that. Anyway, they seemed to be less frenetic than the average American, having more fun out of life. In a way, it irritated him.

A newcomer slipped onto the

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wooden bench across from him, and in split seconds one of the girls had a saucer and full mug of beer before him. The new beer bibber sighed deeply and took down half of his mug in one fell swallow.

"Ah!" he said from deep down.

Rex grinned at him.

The newcomer made a gesture with his mug, as though in a half toast and took another draft. He said, "*Vous êtes un etranger?*"

Rex said, after taking a pull at his own beer, "Sorry, I don't speak Czech."

"Ah ha, you are English. I thought you were French. I am a great admirer of you English. I studied your literature as a student. I am of the opinion that your Lord Byron was the greatest romantic period poet the world produced."

VI

Nobody else at the table seemed to be noticing them or listening in on their conversation. Rex Bader took another pull at his black smoked beer, emptying the mug. Magically, there was another one before him, another pencil mark on his saucer.

He said, "American, not British. However, I share your opinions on the literature, although my own preference among the poets of the English romantic period would be Shelley."

The other was a prosperous-looking, intelligent-looking, substantially built man in his middle years. One received the impression of a love of life, that in spite of high achievement he was not above entering such establishments as the *U Fleku* for a few mugs of beer, to enjoy the raucous music, perhaps to eat a sausage or a dish of the heavy goulash which seemed to be a house specialty.

"And how do you like Prague?"

Rex said, "Very much. This is my first trip into the Soviet Complex. There is much of interest. Much that surprises me."

"Ah?" The other was interested. "And what, for instance, surprises you, sir?"

Rex thought about it. Obviously, the thing to do was to let the other direct the conversation. He said, "Well, for one thing I didn't expect the affluence you've achieved. My reading had led me to believe that you were considerably behind the West in your per capita income."

The newcomer rumbled laughter. "My dear sir, that term *the West*, is a bit on the elastic side. If it means all the countries in the world besides the Soviet ones, when long since such areas as Czechoslovakia passed in per capita income the overwhelming majority of these. But even if you count only the European and North American nations, it still doesn't hold up. You are too sweeping if you think all of the capitalist nations had or have a higher per capita income than all the Soviet ones."

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He took another pull at his beer before going on. "This desperate competition for higher gross national product and per capita income seems to have really first hit the world shortly after the Second World War. Suddenly everybody was GNP conscious and per capita income conscious. Some seemed to find a belief that these statistics would ultimately decide which was the superior social system, capitalism or communism."

"Well, it's one way," Rex said mildly.

But the other was shaking his head, after taking still another swig of his black beer. "If so, from the first not much was proven. This happens to be a bit of a hobby of mine and I am acquainted with some of the United Nations figures since they began compiling them. Such Western countries, so-called, as Italy and Japan, not to speak of Portugal, Spain and Greece, were far behind Czechoslovakia, East Germany, the USSR and even Hungary, in annual per capita income. But the important thing wasn't so much where they were when the United Nations began collecting this data but how rapidly they were progressing."

Rex said uncomfortably, "Well, surely the Western European nations were progressing faster than the Eastern."

The other shook his head. "Some yes, some no. I don't know if you have ever heard of two of your fellow countrymen, Herman Kahn and Anthony Wiener of the Hudson Institute and the book they wrote in 1967 entitled 'The Year 2000'."

"I don't believe so." From the sides of his eyes, Rex Bader checked out the others at the table. Nobody was paying any attention to their conversation, they all had conversations of their own going.

"It was quite fascinating," the Czech said. "And it stands up very well for a work of its type. They had one chart which gave the per capita income of some thirty of the most advanced countries and computed how long it would take for each to attain to the 1965 GNP per capita of the United States which was $3,600. Sweden, it was found would take but eleven years, Canada twelve, West Germany sixteen and East Germany seventeen. France would take eighteen years and England nineteen. Czechoslovakia would take twenty and Japan twenty-two. Italy would take thirty years and Mexico, held back by her population explosion, would take one hundred sixty-two.

"The point I'm making is Kahn and Wiener foresaw that East Germany would be up to or past France and England by 1982 and Czechoslovakia, the USSR, Poland and Romania were not far behind."

Rex said, "But, of course, then, as now, the highest per capita annual income was enjoyed by the United States."

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"No, actually you're wrong. The highest was Kuwait, the Arab oil state. Admittedly the population was only about half a million, but, per capita, their income was the largest in the world. And that, by the way, is one of the points I wanted to make. The fact that a nation's per capita income is high doesn't mean necessarily that the population enjoys it. The Emir Sabah Al-Salim Al-Sabah was absolute monarch. That income went directly into his pocket, more than half a billion a year. Comparatively little of it filtered down to the Arab in the street.

"So far as the average man is concerned, it's not what his nation's per capita annual income is but how much of it he gets and what he can accomplish with it. If an absolute monarch or a bureaucratic government expends the Gross National Product on their own projects, the individual can be at the poverty level. Consider the percentage of your nation's wealth that has been expended on so-called defense, on space programs, on maintaining a top-heavy bureaucratic machine."

"Or yours," Rex said defensively.

"Of course. Both of our countries. It's madness. However, there is another aspect that should be considered. That is, how the GNP and the annual per capita income are arrived at. In the old days, it was comparatively simple when most of the employed were in primary or secondary occupations. It is easy enough to total up the amount of milk produced, the number of tons of ore, the number of pounds of fish caught. And in the secondary occupations, how many tons of steel are made from that ore, how much cheese produced from the milk and so forth. However, when we get into the tertiary occupations we begin to run into problems."

"How do you mean?" Rex said. Evidently they were as interested in such matters on this side of the Curtain as they were on the other.

"Well, let us go back to the days when the battle of the GNP was in its infancy. In your great country you had an entertainer by the name of Robert Hope who was a very popular comedian. His income, so I understand, sometimes reached a million dollars a year. In the Soviet Union at the same time was Glania Sergeyevna Ulanova, People's Artist of the USSR and *Prima Ballerina Assoluta,* usually considered the greatest dancer in the world. Her pay was about twenty thousand dollars a year, which was very high for Russia. Both of these amounts, of course, were added to the GNP of the respective countries. Of course, not even Mr. Hope ever made the sums later enjoyed by The Beatles, of England, and their earnings, of course, totaled into the GNP of that country. At the same time, more than sixty cities in the Soviet

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Union had philharmonic orchestras. All their conductors combined did not total the earnings of The Beatles."

Rex laughed ruefully. "I begin to get your point."

"Yes. But we have not as yet reached the extreme of ridiculousness. For entertainers are, after all, tertiary employees. When we get to our present postindustrial societies the majority of those who are employed are in quaternary occupations. How does one evaluate monetarily the efforts of the president of a nonprofit foundation? Or, let us say we have a noted psychiatrist who devotes his efforts largely to those who hold down well-paying quaternary positions. He treats a popular artist and at the end of the year sends him a bill for $25,000. Without flinching, the artist pays up and later sells the doctor's wife a painting for the same amount. Lo and behold, the Gross National Product has been increased by $50,000. How does one evaluate a painter's work? He may reach the heights of a Picasso and receive a million dollars for a single painting which might not have taken more than a day to finish. I am reminded of the young lad who raised two $25,000 cats and traded them for one $50,000 dog."

Rex Bader laughed aloud and waved to one of the hurrying waitresses who was on her way past with three pint mugs of beer in each hand. She stopped long enough to slide one on his saucer and give him his pencil mark. Rex Bader was beginning to get a bit beer logged, but it still tasted fine.

He said, "Well, what's the answer?"

The other laughed, too. "The answer is that the whole thing has become a farce. In actuality, both the advanced Western nations and the Soviet Complex have achieved to affluence. We both now produce sufficient for our people to lead affluent lives. Nobody starves or goes without adequate shelter, clothing, medical care, and the other necessities, indeed, most luxuries."

The Czech looked suddenly at his wristwatch, which surprised Rex Bader slightly. Few people in the States carried watches any more. They could ask for the time on their portable phones.

The other stood up. He said, "It has been a great pleasure talking to you, sir. I must leave. I hope you enjoy your evening at the *U Fleku*." He looked as though something had just come to him. "If you get hungry, you might try the sausage strudle here, a sort of meat pie. They are famous for it."

"Thanks," Rex said. "Nice to have met you."

The Czech looking at his watch again, hurried away.

Rex Bader reapplied himself to his beer. Now what had all that been about? He had spent the better part of fifteen minutes listening to a lecture on the relative gross

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national products of the United States and the Soviet Complex. What had been accomplished? Obviously, the man was one of those that Roget had expected him to contact. Very well, they had come in contact. Now what?

One of the girls went by with a tray laden down with portions of goulash and of what looked to be pastry. The Czech's recommendation came to him. The beer had created an appetite. He summoned one of the girls and placed his order for a single sausage strudle.

In about five minutes she returned with it, hurried the plate before him and was off. He picked the stuffed pastry up and examined it. It was piping hot and smelled wonderful. He turned it over, considering how to get in the first bite, in view of the size of the tidbit and the heat.

On the bottom was printed GO TO BUCHAREST.

He didn't know what the medium of the writing was, but undoubtedly it wouldn't kill him. He ate the pastry, writing and all. O.K., he'd go to Bucharest.

Back at the hotel he activated the door of his suite and stepped through into the short entrada and started for the bedroom. He came to a halt and looked down at the floor. There was a small sheet of stationery. He picked it up. It read: *Room 1052.*

He was on the tenth floor. Presumably so would be Room 1052. He took the note into the bath, tore it into very small pieces and flushed it away. He opened the door of his suite, looked up and down the hall, saw no one. He started down the corridor, looking for Room 1052 and had no trouble finding it. He stood before the identity screen and the door opened. He more or less expected to find the Czech he had met at the *U Fleku.*

Instead, Tag Dermott looked up at him from the chair in which he sat, a tall highball glass in hand.

The IABI agent said, "Been reading any Shelley, lately?"

Rex grunted and let the door close behind him. "I prefer Keats," he said. "What are you doing here? I thought the theory was not to communicate until I got back to the States. I haven't been here much more than a week. Do you want to blow my cover?"

"There've been some changes. Things are moving faster than the Chief figured on. Have a drink?"

Rex shook his head. "I've just had a drink." This room was considerably smaller than his own suite. He sat down on the edge of the bed, facing the other. "What things?"

"First, have you made any contacts with these jokers yet?"

Rex said slowly, "I don't know whether to tell you or not."

The agent scowled at him. "Why not?" he demanded.

"Because I'm not sure what's go-

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ing on and who's leaking what to whom in this whole project. Everybody seems to know everybody else's supposed secrets. If the same thing applies over here as it does in the States, then I'll never get to meet these characters I'm supposed to meet. They'll avoid me like the plague."

Dermott was still scowling. "That doesn't apply to us, Bader."

"It applies to everybody, so far as I can see. However, I can tell you that thus far I haven't a single name. Now what's all this about there being some changes?"

"What do you know about Intersputnik?"

"Not a thing. It's the Soviet Complex equivalent of our Intelsat, isn't it?"

"That's right. Back in the Sixties, the United States sponsored the International Telecommunications Satellite Consortium and it was an immediate success. After three or four years, the Russkies couldn't bear the idea and started up their own. Their first Intersputnik satellite weighed more than half a ton, four times the size of the four satellites Intelsat had up, but, of course, that was just the beginning. We were just getting under way."

"O.K., what has this got to do with my assignment?"

"A little more background. At first, four U.S. cosmocorps, ITT, AT&T, Western Union International and RCA bought up Intelsat's time and circuits and sold or leased them in turn to clients in over sixty countries. They'd get from $11,500 to $18,625 for one hour's transmission of color television between New York and Paris. That sort of thing. Black and white was cheaper, but at any rate they made a neat profit from the beginning."

Rex was still mystified. "O.K., and so now?"

"Now it's a much bigger project. That was peanuts. It developed into one of the biggest operations the world's ever seen."

"What are you getting at?"

"Haven't you been getting the news?"

"Over here?"

Tag Dermott was impatient. "You can get the American news over here. At any rate, a bill was presented in the Senate the other day to unite Intelsat and Intersputnik. Senator Hooker's people, and Admiral Westover and his, don't like it and neither does the Chief."

Rex thought about it. "Does it have much chance of passing?"

"Not if the Senator, the Admiral and the Chief can help it. They figure it's the first really big attempt of the cosmocorps gang to break down the barriers between the Soviets and the free world."

"Free world?" Rex grunted. "Do they still use that term? Why *not* splice up the two satellite communications outfits? It'd make the whole operation more efficient. It makes a lot of sense. It's not the

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first thing we've ever cooperated in. Coast and geodetic surveys, weather stations, Antarctic exploration."

Dermott said flatly, "There are angles to this. Angles with a lot of scary ramifications from the viewpoint of our people. This isn't just a cooperation in exploring."

Rex waited.

Tag Dermott said, "The bill would involve all the services of the two satellite communications systems being free. Available to any country in the world, and free."

"*Free?*"

"That's right. With some complicated system where the expenses would be borne by every country that employs the system on a per capita basis. Nobody would make any money out of it."

Rex hissed between his teeth.

The agent said, "It'd be a step in internationalization of a major industry that'd start this world government project of the cosmocorps people off at a gallop. It's obviously only the first step, too. They have no intention of stopping there."

"What's the second step?"

"The grapevine has it that the second step would involve all international transportation being welded into one cosmocorps and being declared free."

Rex bug-eyed him. "But *why?* Everybody and his cousin would be tearing around the globe, having the time of their lives free-loading."

Tag Dermott shook his head. "Don't argue with *me*. I'm not in favor of it. I'm a free enterprise boy, myself. But they deny that would happen. For one thing, with the supersonics we have these days, world travel is already within the reach of just about anybody. Besides, the big expense of traveling isn't the transportation. It's hotels, meals, and all the rest of it once you get from one place to another. They've had free transportation within the Soviet Complex for some time. Do you think everybody spends all their time riding up and down the subways, just because it's free? They claim it cuts down on the number of persons needed to handle the paperwork. O.K., this step would eliminate hundreds of thousands of people involved in all the gobblydygook of international travel. That's their story."

"And the big emergency is?"

Tag Dermott shook his head at him. "Obviously, it would be the beginning of the end. Internationalize world communications and transportation and before the decade was out there'd be half a dozen other things. The cosmocorps would take over. There'd *be* no more United States, no more Soviet Complex, no more countries, period."

Rex Bader thought about it for another long spell. He said finally, "I doubt if the bill will go through. Too many congressmen have irons in the fire."

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Dermott snorted, "Too many congressmen are the tools of the cosmocorps. These days you can't tell where industry leaves off and government begins. Men like Francis Roget have a dozen congressmen in their pockets. In each pocket, for that matter."

"The Soviets wouldn't stand for it."

"Some would hate to, but can you see how world opinion would be for it? Now the two super-nations have a monopoly on communications satellites. Everybody has to pay up to one side or the other. Free communications would be received with open arms by the so-called Third World."

"O.K.," Rex said. "So how does this affect my assignment?"

Dermott said slowly, "The Chief wants something hot. Something to make both the American Congress and the lads in the Kremlin back away."

It was Rex Bader's turn to scowl. "Like what?"

"Like the U-2 affair back in Eisenhower's administration. Like the Czech suppression in 1968, or the Hungarian one back in 1956. Like the Bay of Pigs fiasco, or the Cuban missile confrontation under Kennedy. Something to chill up the Cold War."

"Cold War? That's another term I haven't heard for a coon's age."

"Well, let's hope you hear it more often," Dermott said grimly. "Otherwise, you're going to wind up a man without a country." He grunted sourly. "Along with all the rest of us."

Rex looked at him questioningly. "Just out of curiosity, why are you so against world government, Dermott?"

"Aren't you?" the other demanded.

"I asked you first. Frankly, I haven't made up my mind, entirely."

The other's face worked. "Because I'm an American and want to remain one. I don't want to become a fellow citizen of some uneducated black running around in a G-string in Tanzania or wherever."

"It's just a matter of time, isn't it, before that black gets an education and affluence enough to wear more orthodox clothes? And that would be sped up if the whole world was cooperating."

Tag Dermott, his face dark, came to his feet and went over to the door and opened it. He said, tightly, "You've got your orders, Bader. The Chief wants you to keep your eyes open for some way to make a wheel come off this attempt at cooperation. If you need some help, I'll be around and, through me, our whole organization is available."

Rex Bader stood, too, and went to the door. He said, as he left, "You know, I've often wondered who blew the tail off that U-2 Powers was flying."

Tag Dermott scowled at him. "What is that supposed to mean?"

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"His coming down in Russia at that time sure threw a monkey wrench in the works so far as a détente between the Soviets and the West was concerned. There were various elements in the States at that time that didn't want to see such a détente, and felt about it strongly enough to have pulled just about anything to prevent Eisenhower and Nikita Khruschev from getting together."

The agent grunted. "Well, start thinking in terms of other monkey wrenches when you make these contacts of yours, Bader."

Rex Bader made his way back to his own quarters thoughtfully. He imagined the reason that Dermott had preferred that he come to the agent's room to talk was the off chance that Bader's room was bugged, in spite of the fact that Colonel Ilya Simonov had guaranteed otherwise. But, for that matter, how had Dermott known that his own quarters weren't bugged? Rex shifted his shoulders in an unconscious shrug. He was getting bug-conscious these days. Possibly the IABI man had an electronic mop and had checked out his room before their meeting.

He activated the door of his suite and entered. The beer had largely worn off. He made his way to the living room with the intention of dialing himself a slivovice, the firey Czech plum brandy for which he was building a fine tolerance.

He pulled himself up abruptly.

Luis and Harry sat there, obviously patiently awaiting him.

VII

Luis said, "Been reading your Keats lately, Buster?"

Rex stared at him. "What is this, a convention? I thought the idea was to keep away from me."

Harry said, empty as always of expression, "You're supposed to answer Coleridge. Wasn't he the one who wrote 'The Ancient Mariner'?"

Rex Bader went over to the bar in disgust and dialed the drink he doubly wanted now. He said, "Erudition from a couple of thugs?"

Luis said, "This pair of thugs have had as much schooling as you've had, Buster."

Glass in hand, Rex came back and sat down. "Yeah? Well to keep up this high level of conversation, what are you trying to do, get this particular albatross shot?"

Luis said, "We follow orders, Bader, just as you do. There's been a meeting of the Board of Diversified Industries. Miss Anastasis has some new orders. Have you heard about the bill to internationalize all communications?"

"Yes." Rex Bader knocked half of his drink back. He deliberately refrained from offering refreshments to them. He was still irritated by his conversation with Tag Dermott. "What's it got to do with you people?"

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"*All* communications," Harry said, as though explaining something to a dense child."

"So?"

Harry said, "Look, International Diversified Industries is diversified. Period. It has lots of interests. One of the biggest is a network of communications that involves practically every booky in the world. It's all but a monopoly. Goes into every country where making book on the horse races is legal, and even some where it isn't but the local authorities have itchy palms."

"Oh, I see."

Luis said patiently, "Miss Anastasis and the Board would take a dim view if this international communications amalgamation went through. It'd just be a matter of time before every country we operate in would nationalize, then internationalize our facilities."

Rex snorted, "The way you talk, Luis, you'd think you had a slice of the cake yourself."

Luis looked at him evenly, "I have, Buster. A small slice, but a slice. Don't get the idea that we're a couple of crumb-bums like yourself."

Harry said, "All right, let's cut this out and get to the point."

Rex said, finishing his drink, "By all means. So what's the point?"

"Miss Anastasis figures that since Roget and his Intercontinental Communications are prominent in this cosmocorps thing, that most likely you'll be getting in touch with some of the communications bigwigs over here."

"I imagine that's possible."

"Great, Buster. As soon as you do, we want the name or names. We want to know who's at the top of the ladder on this side, in the gang that likes the idea of this internationalizing of communications."

"Why? I was supposed to report to Sophia Anastasis, when I got back to the States, not to you."

"We gave you the password, Buster. We need the information soonest. We can't wait until you get back home."

"And suppose I can't get it?" Rex said argumentatively.

"Then we want the name of some other bigwig who's in favor of this cosmocorps thing. Somebody big enough so that if anything happened to him a big stink would go up."

Rex Bader shook his head in disbelief. "Good grief," he muttered. "Somebody else who wants another U-2."

"What?" Luis demanded.

"Nothing. O.K., you've delivered your message. Why don't you get along? Every minute you're here increases the chances that somebody'll find out and smell a rat. I'm not supposed to know anybody in this town. How do you know this room isn't bugged?"

Luis grinned contempt and pulled a small device from his pocket. It was a metallic gismo

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about the size of a cigarette pack. "Haven't you ever seen one of these, Bader? Maybe they're a little beyond cheap private eyes. It's a scrambler. No electronic devices work within twenty feet."

However, both he and Harry stood and started for the door. Rex Bader followed.

Just as they got to the arch that led into the entrada, Harry turned suddenly and said, "We don't exactly like your attitude, Bader. Maybe you need a little lesson on just whose side you're on."

He lashed out a fist toward Rex Bader's belly, but had made the mistake of telegraphing his intention with too much talk.

Rex swung sideways, sucked in his stomach, chopped out with his right hand and hit the other's wrist. He let his right foot go back, swiveled, and using all his weight speared his right hand into the other's side, immediately below the ribcage. The hand was held not as a fist but with fingers extended, pearlike. Harry jackknifed forward, his face white in agony. He fell to his knees and remained there both trying to catch his breath and groan.

Rex Bader spun on his companion, but Luis was no amateur. He had stepped backward, one, two, three and his hand had blurred toward his left shoulder. It emerged with a small gyro-jet pistol, ugly, but efficient looking.

Luis shook his head dangerously. "That's enough. Harry was out of line, but that's enough."

Rex said tightly, "I get the feeling that you two think I'm a little on the softy side."

Luis shook his head, his gun hand very steady. "Not after that. Straighten up, Bader. Miss Anastasis is paying you plenty. Earn it. We pay for what we need, but we want delivery. Don't need any second warning. You won't get it. And don't get delusions of grandeur, about taking Harry just now. The best man with his hands who ever lived couldn't take a pro who has a gun. Smarten up, Bader. You've been bought. Stay bought, or you'll be sorry. We're a big outfit, Bader."

Rex Bader stared at him, his hands at his sides.

Harry stumbled to his feet, his face still white. "I'm going to plug you one," he snarled.

"I wouldn't suggest it," Rex said.

Luis said, "All right, you two. Let's forget about it. You're acting like a couple of jerk kids. Come on, Harry, let's get out of here."

Harry turned on his companion, glaring. "Sure, great. He didn't foul you. You just stood there like a . . ."

"Shut up," Luis said. "Keep it for another day."

Harry snarled at Rex, "Don't think there won't be another day, Buster."

Rex said sourly, "There was. Re-

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member? There in the park in front of my apartment house. You both came in on me from the rear, when I wasn't expecting it. Am I supposed to love you, just because we work for the same boss?"

Luis said, "Come on, Harry. Miss Anastasis isn't going to like this."

"How'll she know?" Harry growled.

Luis sighed, even as he returned his gun to its shoulder rig. "She'll know. She knows everything."

Rex Bader hadn't told them that he was on his way to Romania the next morning. He hadn't told Tag Dermott, for that matter. He was beginning to get the feeling of being penned in. He had the damnedest feeling that Dave Zimmerman or Temple Norman would be turning up next.

He could have taken the underground expressway to Bucharest, the automated electro-steamers were evidently as efficient here in the Soviet Complex as they were in the West. However, he had the desire to see at least a little of the country, as small as that might be from the air. Rex Bader was of the opinion that the more efficient a means of transportation became, the less desirable. If you walked, at the rate of three miles an hour, at least you saw the area through which you traveled. Ride a horse or a bike and the same was still largely true. But by the time you got into a car, or, in the past, a train, and already you were zipping along at a speed that precluded experiencing the countryside. And an aircraft? You saw a little as you took off and as you landed; staring down was about as profitable as looking at a map. He decided that it must really be meaningless to fly in a spacecraft—you'd be going faster and seeing less than any means of travel ever devised by man.

He was largely correct. The Soviet Supersonic flew at an altitude that largely precluded seeing the countryside below. Rex Bader sat with a tourist map on his lap, playing his part, and peered down. Within what seemed moments, they were over the Bohemian Moravian Highlands and, for his money, it could have been the Appalachians just as well. Their only stop before Bucharest was at Budapest, that once capital of Hungary before the merging of the Soviet countries. That, at least, had its elements and he decided that the twin cities of Buda and Pest on opposite sides of the Danube boasted one of the most beautiful settings of any town he had ever seen, certainly the equal of San Francisco or New York.

They were off again and a steward came through with trays of small pilsen-type glasses. He hovered over Rex Bader politely, "Barak, Comrade," he said. "The Hungarian national spirit."

Rex said, "Thanks," and took one up. He sniffed it. There was a faint odor of apricots in the bouquet.

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He decided distastefully that the Hungarian national beverage was evidently a cordial. Largely, he disliked sweet drinks. However . . .

He knocked half of the slightly yellowish liqueur back over his tonsils and then all but spewed it up again onto the seatback in front of him. He closed his eyes and said, "Wow!" He couldn't remember ever drinking anything quite that strong before. He looked down at the glass reproachfully. Barak might be based on apricots, but it had been distilled down to the point where there was no sweetness left at all, and to an alcoholic content that must have been pushing two hundred proof. If this was the national beverage, the Hungarians wouldn't have to bother brushing their teeth. This stuff would take the enamel off, all on its own.

Down below, there were new aspects of the scenery and they crossed and recrossed the winding Danube over and over again until finally it disappeared to the south. If he was following his map correctly, they were now crossing into what was once the nation of Romania and that portion of it known as Transylvania. First the Bihor Mountains and then the Transylvania Alps. It was somewhere in here, Rex Bader decided, that Castle Dracula had been situated. As a matter of fact, once in a while he could make out former castles on strategically located hills or mountaintops.

They pulled into Bucharest's Baneasa jetport in the early afternoon and a dark-complexioned bright young thing in a trim airport uniform met him at the Supersonic's gangplank.

She said, brightly, "*Buna ziua,* Comrade Bader."

Rex Bader looked at her speculatively. He said, "Doughnuts to dollars will get you that *Buna* means good. I know some Spanish and I know that Romanian is a Latin language, too. And, just guessing, I'll bet that second word means either afternoon or day."

She tilted her head a bit and looked at him from the side of her eyes. "You'd make a good detective, Comrade Bader. I said, 'Good day.' "

He made a mock bow. "Retired. As though you didn't already know. However, you're wrong. I made a lousy private investigator."

Her laughter tinkled. "We have, of course, a short dossier on you, Comrade Bader. But you needn't worry. It is routine. The *Chrezvychainaya Komissiya* reports that you are harmless."

"That is a gross lie," Rex said flatly. "I am very dangerous indeed. Especially to young ladies. Especially to pretty young ladies."

She held her right hand over her heart and recited as though very passionately:

" 'Here's a sigh to those who love
me,

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" 'And a smile to those who hate;
" 'And, whatever sky's above me,
" 'Here's a heart for any fate!' "

He started to chuckle, and then suddenly got it. He blinked at her, thought fast for a moment and then cleared his throat and got out:

" 'I arise from dreams of thee
" 'In the first sweet sleep of night,
" 'When the winds are breathing
low,
" 'And the stars are shining
bright.' "

She laughed and said, "You *are* a romantic. But I don't believe I know that one."

He said, "I was a great one for poetry when I was going to school. It's from Shelley. The first stanza of 'The Indian Serenade'. And yours was from 'To Thomas Moore' by Lord Byron, of course."

"Of course," she said brightly. She held out a hand. "My name is Ana Georgescu. I'm from NTO, our national tourist office. My job is to get you oriented, Comrade Bader."

He shook the hand, finding it feminine but firm, and said, "Well, fine. How in the world did you know I was coming?"

They turned and headed in the direction of the jetport's administration buildings, walking side by side.

She said, "Our sister organization in Prague, *Cedok,* called ahead, as soon as you had made your supersonic reservations. We make a policy here of welcoming our distinguished foreign visitors. Of . . . of getting them oriented."

"And I'm a distinguished visitor?"

She said, half mockingly again, "Anyone who can afford to travel using deluxe class accommodations in the Soviet Complex is distinguished, Comrade."

"That's one way of deciding," Rex said. "O.K. Orient me."

"Hm-m-m," she said. "You have a manner of pronouncing it that gives it a leering quality."

He took her in all over again. Brunette. Only up to his shoulder in height. A broad, good mouth and delicate chin. Creamy dark of complexion and with a very faint down on her face, that came off attractively. She was, say, twenty-five years of age and her English was at least as good as his own. She was sharply intelligent and obviously well educated, item, her being able to quote from Byron. And somehow she was connected with the camp he was to contact for Francis Roget and his group.

Well, it was their canoe, let them start paddling.

She said briskly, "I recommend the Athenee Palace Hotel. It is well situated in the downtown area. You'll be able to participate in the festival without going out of your way."

"Festival?"

"It is September, Comrade Bader.

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The Folklore Festival is in full swing. Didn't you know? At the NTO offices we assumed that was why you had come to this part of the Soviet Complex at this time of the year."

He carried on the gobblydygook, it coming to him that it was quite possible to be monitoring this whole conversation from a point hundreds of yards away. Or, for that matter, a lip reader with binoculars might be checking up on them. And, of course, it need not be Ilya Simonov's people, either.

He said, "Then that will be just added interest. Actually, I came on an impulse. I was getting tired of Prague and wanted to check out some of the other major cities. I read in one of the guide books that Bucharest is called the Paris of the East."

She nodded, seriously. "There are many similarities, the wide boulevards, the many parks, the manner in which the Dimbovita River maunders through town in much the same way as does the Seine in Paris. Then there is the gaiety of the people, the night life, the fact that Bucharest is the nation's art center. Ah, here we are. Would you prefer the underground or surface transportation, Comrade Bader? I can summon an electro-steamer limousine, if you wish."

Rex followed her into the administration building. They could have as easily been in that of Greater Washington, Denver, or San Francisco. There is something identical in jetports, the world over; the scurrying multitudes, the luggage floaters, the ticket windows with their automated reservation screens, the rows of souvenir and traveler's needs stands with their displays and order boxes, the autobars and snack bars, the TV screens flashing their news of arrivals and departures.

He said, in some surprise, "Electro-steamer? Do you mean you allow individual cars into the downtown areas of a city this large?"

She smiled up at him. "This would be an official NTO limousine, Comrade Bader, not a privately owned vehicle. We don't have privately owned vehicles in the Soviet Complex any more. It proved an inefficient manner of getting about."

"We have a few in the States, not many," Rex said. "O.K., car it is. It'll give me a chance of seeing the town."

"If we can get through the mobs of celebrants," she said.

They had come up to an area the sign above which proclaimed it the offices of the NTO in half a dozen languages, including English. There was one woman present, attired the same as was his guide, but she didn't bother to look up from the TV phone before her. Evidently, NTO was as automated these days as was American Express-Cooks that travel cosmocorps of the West.

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And Georgescu stood before another phone screen, activated it, and spoke in a language which Rex couldn't begin to follow. Romanian, evidently. She turned back to him and said, "This way, please."

She led him to a nearby door and out onto the street on the opposite side of the building from which they had entered. By the time they arrived at the curb, the limousine was there. Its door opened at their approach. The car was identical to several in which Rex had ridden in Prague, when he had taken spins out into the countryside, less ultra-modern than that of Sophia Anastasis, or, at least, less loud. It came to Rex Bader, all over again, that the Europeans, both of East and West, made more of an effort to retain some of the charm of yesteryear than did his compatriots. The urge to press into tomorrow seemed not quite so strong. He wasn't sure if he approved or not.

And gave directions into the car's screen.

Rex said, "My luggage?"

"Will be in your suite, Comrade." She smiled at him reproachfully. "We aren't so primitive as all that."

"No customs? No presentation of my International Identity Card?"

"You went through that, such as it is these days, back in Prague, Comrade Bader. And, of course, nowadays it is not even necessary to open luggage to inspect it thoroughly. So far as your identity card is concerned, you were checked out on identity before you ever left your own country. As soon as you received your reservations to fly to the Soviet Complex, in fact."

"Time gallops on," Rex muttered, then added, to keep the conversation on its original light level, "though sometimes I'd like to get off the horse—or mule, or ass, or whatever it is."

She laughed, although the *bon mot* hadn't been that good.

They started down what Ana told him was Baneasa Road and shortly passed over the Dimbovita River, Rex already noting that Bucharest was a more modern city than Prague, with considerably more high-rise apartments of the Western type. He wondered how long it would be before the pseudo-city came to the Balkans.

And already he was beginning to see evidence of the Folklore Festival. In Prague, the only national costumes he had come up against had been in nightspots on performers, or in such Middle Ages taverns as the *U-Fleku* had been. But here, on the streets, they were everywhere. Both men and women were wearing highly embroidered folk costume in red, green, white, gold and blue.

Mobs of them were parading up and down the streets, some occasionally arm in arm, singing at the tops of their voices, whether or not they had musical accompaniment. From time to time the car slowed

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or even came to a complete halt while folk dancers doing their bit in the street's center cleared out of their way. Romanian folk dancing was on the frenetic side and of a half dozen different types. Sometimes there would be as many as a dozen men, arms over each other's shoulders, swinging out at a pace that seemingly couldn't have been maintained for more than a few minutes; sometimes the line would be of women, or men and women alternating. Largely, they were flushed of face, either through exertion, or drink—or both.

Once when the limousine ground to a halt, a bleary-eyed, staggering, costumed reveler approached Rex Bader's window and thrust a bulbous bottle through it and slurred something in an unknown tongue the last word of which came through as *lichior.*

Ana said calmly, "He invites you to have a drink of his *tsuica.*"

"What's *tsuica,* or however you pronounce it?" Rex said.

"You'll see," she said dryly. "It is the Romanian nation spirit." She added, "It would be an insult not to accept."

Rex took the bottle. There was no top on it. He applied it to his mouth, took a gulp and said, "*Whoosh* . . ." It was as potent as the Hungarian barack had been.

The dancer beamed drunkenly at him, and seized the bottle back and staggered away.

"You take your festivals seriously here, don't you?" Rex said. "How long will this go on?"

"All night," Ana said.

"Starting *this* early in the day?"

"Starting yesterday."

They turned left down what Ana told him was Kiseleff Road and what Rex would have thought of as a boulevard. Bucharest, he decided, deserved its Paris of the East title. The crowds were getting thicker, there were more bands, more groups of wandering musicians, some numbering a dozen or more violinists, guitarists, accordion players and what not. Some strolled about solo. A good many of them appeared to be gypsies, Rex decided; one led, of all things, a dancing bear.

Rex said, "After the hotel what?"

"Oh, we'll go out to see the town, if you would like."

Rex looked over at her. "There isn't anybody in particular that you'd like me to meet?"

She made a quick gesture of putting finger to lips, but then carried through as though she was simply touching up her lipstick.

She said, "Why no. Whom did you have in mind? I am afraid that we have no equivalent of private investigators, retired or otherwise, in the Soviet Complex, so it would be impossible to introduce you to colleagues with whom to talk shop."

Rex said, "O.K., skip it. Tell me, in the States every vehicle, both

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private and public, is automatically monitored through its phone screen by computer. A record is kept of every trip. If there is any reason to, the conversations taking place in any vehicle can be recorded. Are you that highly automated here?"

"Even more so, Comrade," she said evenly. "In the Soviet Complex, every conversation that takes place in a vehicle is recorded. Our police have found it a very efficient method of keeping track of would-be subversives or other enemies of the people. Not simply vehicles, of course, but every public building, and almost every home, for that matter. It has proven very practical."

"I'll bet it has," Rex said grimly. "What do you mean by almost every home? Which ones would be exempt?"

"High-ranking Party members sometimes find it expedient to dispense with monitoring of their homes and vehicles. They, of course, are on a level where it is not necessary. One who is on the highest levels of government obviously is not interested in subversion. One does not subvert one's self."

"I see what you mean."

The car progressed more slowly through the teeming crowds of peasant costumed celebrants. Rex Bader was impressed. The lines of dancers lengthened. On occasion there must have been as many as a hundred of them at a time, arms entertwined.

Rex Bader was fascinated. He said, "They don't dress like this all the time, do they?"

She laughed at him. "Of course not. However, we Romanians are possibly the most folk-costume conscious nation in Europe, either East or West. Everybody prides himself on his costume. Only on special occasions are they brought out and worn."

They entered a large square and inched their way through it. He had to admire the auto-controls of the vehicle. The square are lietrally packed.

"This is the *Piata Victoriei,*" she told him in a guide's tone. "You would say, Victory Square. Would you like me to tell you how it got its name?"

"Never mind, every town on Earth seems to have a Victory Square or a Victory Avenue, no matter how many defeats the country might have suffered in its time. And, come to think about it, I don't believe I've ever heard of a Defeat Square."

They emerged to a wide boulevard beyond and she said, an amused quality in her voice, "How right you are. This is *Calea Victoriei,* which comes out, Victory Avenue."

It was not quite so jam packed with dancers and celebrants as had been the square, but it was packed

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bad enough. They crept forward.

They finally pulled up before an ornate hotel entrance. Offhand, Rex Bader couldn't remember an American hotel over twenty years old these days. Such buildings, at home, had a habit of coming down to make room for a more modern hostelry almost as soon as they were in operation. Coming back to a city you hadn't been in for ten years had its complications. You had a hard time finding your way around. This place looked as though it was at least half a century old. But then, Prague had been the same, or even more so. Some of the hotels in Czechoslovakia had been centuries in age. Actually, Rex Bader hadn't minded. American ultra-modern buildings had a sterile quality about them that he hadn't particularly noticed until he came to Europe.

They emerged from the electro-steamer and turned to head for the entry. And were immediately surrounded by two separate bevies of dancing, swirling, shouting and singing revelers. One group surrounded Rex, arms entwined, feet a-flying; the other abducted Ana Georgescu, shouting laughter.

Immediately, she laughed, too, and tried to call something to Rex but they carried her off. The last expression Rex saw on her face was one of sudden alarm but then she waltzed into the street, her head too short to be seen over the highly costumed kidnappers.

Somebody shoved a bottle into Rex's hands. A girl, laughing into his eyes, grabbed him about the neck and kissed him hard. She was a buxom wench spectacularly done up in blues, whites and golds.

"Hey!" Rex said.

They were hustling him out into the street. Various pedestrians, who had been standing in front of the hotel, watching the fun, laughed briefly at his discomfort, but then turned their attention elsewhere as his group, singing and dancing still, hustled and bustled him into the street.

They twirled around him, shouting, most of them red of face, sweating, some already showing by their uneven dance steps the effects of *tsuica* and whatever else it was they were drinking. Just to be amiable about it, in spite of the fact that it was all he could do to stay erect, he took a pull at the bottle. It was *tsuica,* all right, all right. He tried to pass the bottle on to someone else, but most of them seemed already to have one of their own.

They swirled around an old-fashioned, horse-drawn gypsy caravan, highly painted but obviously a carnival type prop, rather than an antique.

Rex was beginning to get tired of the mauling he was taking. Had he known the dance steps, he would have made the effort to join them, for a moment or two, to maintain the spirit of the thing, but

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it was all he could do to keep on his feet.

For a moment, the crowd seemed thicker still and he was up against the caravan, his back to its rear end. Skirts and shawls swung suddenly higher in a great swirl. He felt a door open behind him. A push from in front.

And suddenly he was inside. The door slammed shut.

"Welcome to Romania, Rex Bader," a voice said smoothly.

VIII

Rex was on the floor, trying to get his balance. He sat up, then stood and glared. There were two of them, civilian dressed and both sat on the wooden seat, a bench which ran along one side of the gypsy vehicle.

"You must pardon the romantic method of contacting you," the first one said.

Rex said, "O.K., but I'm beginning to think that I'm earning my money. What's the password?" And, in actuality, he was truly interested in what the answer might be. He had enough passwords to fill a codebook, he had long since decided.

"Why, Byron, of course."

"Shelley," Rex snapped. "I've already been contacted by a Byron. What was wrong with Miss Georgescu? Frankly, she was better looking than either of you." He brushed dust from his pants.

"Nothing was wrong with Ana," the second one said. "She brought you here. If you had a tail or if you were being monitored, we could not think of a better method in which to shake them. And now, Ana, of course, has a perfect alibi for having lost you. You can turn up at the hotel later, somewhat drunk and bedraggled from the festival, supposedly, and nobody would think twice."

Rex looked them over. In actuality, they were cleancut, intelligent looking types somewhere in the vicinity of his own age. One was blondish and looked like a Slav, the other dark and probably a Romanian, he decided. There was no reason to believe they weren't what they said they were.

"How do you know that this vehicle isn't bugged?" he said. "I'm getting to the point where I'd suspect my own mother of being bugged."

They laughed and the blond one made a slight gesture encompassing the interior of the caravan which had already begun to move, the horse's hooves going *clop-clop* even over the shrill sounds of the dancers outside.

"It is not the sort of vehicle that even the most ardent police investigator could consider worth bugging, Mr. Bader. Please sit down, we have a short ride."

Rex sat. There were windows in the copy of a primitive gypsy caravan, but they were heavily cur-

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tained and the embroidered curtains, drawn. They maintained silence and after ten or fifteen minutes most of the sounds of revelry faced away. The horse's hooves could be heard more distinctly.

"Where are we going?" Rex said.

The brunette one shook his head, nothing more.

The road seemed to incline downward and all sounds of the street disappeared. Rex Bader assumed that they had entered a garage, or some other entry into a building and was proven correct a couple of minutes later when one of his two captors, if that was the word for them, came to his feet when the caravan stopped.

"Here we are," he said and opened the door in the rear.

They emerged into what was obviously a fairly large garage, near an elevator bank. Silent, they led him to one of the elevators and when the door closed behind them the blond one gave orders to the screen in what Rex assumed was Romanian. They went down two or three levels and the door opened again. They stepped forth into an empty corridor. The brunette led the way, the blond bringing up the rear.

They approached a large, heavy door and the brunette said something into its identity screen. When it opened, the dark one stepped to one side, the light one to the other and they stood as guards.

O.K., Rex decided. The others had the ball, it was up to them to start pitching.

It was furnished as a conference room. A heavy table dominated it. About ten persons sat about the table, looking at him with interest. At the far end sat Colonal Ilya Simonov, of the *Chrezvychainaya Komissiya*. The door closed behind Rex Bader.

At long last Rex Bader cleared his throat and said, "I thought the scheme was for you people to stay completely away from me during this assignment."

The cold, efficient appearing counter espionage troubleshooter quoted, " 'The best laid schemes o' mice and men gang aft a-gley,' Mr. Bader."

The eyes of Rex Bader would not have bugged more had the Soviet super-agent suddenly levitated. It couldn't have been coincidence.

It sounded inane, but out it came. "Do you know what you're saying? That's a quote from Robert Burns!"

"That I am an associate of Mr. David Zimmerman? Of course, Mr. Bader. The question has become of whom are *you* an associate?"

Rex Bader ran his eyes around the ten others, who thus far had remained silent, their own eyes on him in interest. He came back to the Soviet agent.

"Possibly I'm not completely sure."

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"It would seem, Rex Bader, that you are not simply a double agent but at least a triple, and, if you count myself, a quadruple, and if Mr. Zimmerman's American group is numbered you are a five-time agent, serving that many opposed organizations. You get around, Mr. Bader."

For the moment, Rex ignored that. Still standing near the door, he indicated the table with his head. "Who are these men?"

"Those you were sent to contact. However, the situation being what it is, they are somewhat inclined to hesitate before confiding in you, Rex Bader."

Rex looked at them, one by one. "You are influential scientists, engineers, educators and so forth interested in exploring the possibility of internationalizing, still further, cosmocorps, with the eventual aim of a world government based on them?"

One of the older of the group nodded and said, "That is as good a method of stating it as any, I suppose."

There was an empty chair at the end of the table opposite from Ilya Simonov. Rex went to it deliberately and sat down. He gave a long sigh. For the first time, he noticed that the Czech he had talked to at the *U Fleku* was among the number present. He nodded to him, received a cheerful nod in return, but the other didn't speak.

"O.K.," Rex said. "I suppose it's time to put the cards on the table."

Simonov said flatly, "The difficulty seems to be that you evidently are holding five hands, Rex Bader. As an old espionage-counter-espionage pro, a number that surprises even me."

Rex looked at him, scowling, and said, "Why bring me into it if you were already in contact with this group? Why couldn't you have handled it?"

"And blow my cover?" the other said reasonably. "You see, I, too, have been more or less acting as a double agent. However, in actuality, it has been since I saw you last that I made arrangements with Mr. Zimmerman's people. I had not really known they existed until your activities brought home to me the fact. But now, Mr. Bader, please! Just whom are you working for; Mr. Roget, Miss Anastasis, Mr. Coolidge, the secret police of the Soviet Complex, or Mr. Zimmerman? Or what combination of these?"

"Perhaps for myself," Rex said bitterly.

There was now a dangerous element in the other's voice. "Mr. Bader, the stakes are high in this game in which you mentioned putting down the cards."

"Don't I know it?" Rex said bitterly. "So high that when I wanted to drop out, before the game had hardly begun, I was afraid to."

Ilya Simonov took him in but for the time held his peace.

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Rex said, "I doubt if my life was in danger from Roget's group, when I turned him down. And although Dave Zimmerman evidently can play a bit rough if the occasion demands, I doubt if it was from him, even after he had disclosed his activities. However, the Inter-American Bureau of Investigation is an organization I am afraid of. But not as afraid as I am of the *Chrezvychainaya Komissiya* and of International Diversified Industries. I came to the conclusion that I could be decided expendable by any, or all, of these. They had each bared their souls, so to speak. I knew too much."

"So?"

"So nobody would eliminate a man they thought they had in pocket. I had to let them all think that seemingly I was on their side. When a card game is crooked, Colonel, you're an ass to play your own hand honestly."

The oldest of the group, who was evidently in the way of being spokesman, had to laugh. "But the question still remains, whom do you represent?" he said.

Rex Bader said, "Me." And when they all scowled at him, he added slowly. "When this first came up, I told everybody I wasn't political. Well, actually this is more than political. And possibly some of my father's idealism has rubbed off on me. I'm as interested as the next man in guaranteeing that the bombs never fall. I'm even largely in favor of world government, sooner or later. But the question is, which one of your groups is more apt to deliver world government and no bombs?"

They considered what he said, some still scowling. They consulted in some language he didn't place, although it was probably a Slavic one.

The spokesman finally said, "Very well, Mr. Bader. Your original message was from Francis Roget of ICI. Please deliver it."

Rex did, at length. From time to time one would interrupt with a question. At the end, all present had at least one question. He answered as best he could. Roget had gone into great detail on just what he was to say to them.

Finally, the elder spokesman nodded. "Very well. In actuality, of course, there is comparatively little that we weren't already familiar with. Among other sources, Colonel Simonov has been a font of considerable information."

Rex looked at the top espionage agent. "Where do you come in on all this? Supposedly, you're in the equivalent camp of John Coolidge."

Simonov looked at the meeting's chairman, if he might be called that. He said, "Comrade, perhaps some background is due Mr. Bader."

The older man nodded. He said, "I understand that you are not completely ungrounded in socio-

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economics, Mr. Bader However, you of the West often have some strong misunderstandings about the situation that prevailed and prevails in the Soviet Complex both at earlier dates and the present."

He leaned back a moment and thought about it before going on. Then, "Mr. Bader, the Russian Revolution of 1917 was a fluke. It should never have happened. History was not ready for the Bolsheviks to come upon the scene. In many ways for the followers of the teachings of Marx and Engels and for the world for that matter, it was a tragedy. The situation was brought on by the confusion of the First World War and the collapse of the Russian military and goverment. Lenin was given an opportunity which he had never really expected in his lifetime. However, upon the Bolsheviks taking power he stood before their first assembly of the Supreme Soviet and said words to the effect that they would now proceed to establish the first Socialist State. He was mistaken, Mr. Bader. It was quite impossible for that body, or any other body in Russia, to build socialism. Russia was far from ready for socialism. Socialism, no matter if you think it good, bad, ridiculous, or even an impossible society, presupposes a highly industrialized one. You can't start with less. Russia didn't have it. They proceeded to try and muddle through." He hesitated and looked at Rex.

Rex said, "O.K. You haven't said anything really new to me so far."

"Of course not. Keep in mind, Mr. Bader, that those Old Bolsheviks were idealists. First-generation revolutionists, willing to die for their honest beliefs, mistaken or not. Most of them finally did die for them when the second generation, led by Stalin, came along. Stalin supposedly was one of the Old Bolsheviks himself but he was slyly clever enough to stay out in front of the coming opportunists and to preside at the butchering of his former comrades. His was the second generation of the bureaucrats who had taken over the task of modernizing backward Russia, supposedly preparing it for true socialism. By the time the third generation of bureaucrats took over, they were completely opportunistic, viciously so, Mr. Bader. The original Bolsheviks had taken no more salary for themselves than received by an ordinary mechanic in a factory. The new breed paid themselves as highly as their equivalents in the West. They became the New Class, as the Yugoslavian Milovan Diilas had it. More than that, they began to perpetuate themselves. They made sure that their children went to the best schools, entered the Party and eventually took over the nation's most lucrative positions. By the fourth generation, this situation had largely solidified itself. The Party had become a ruling caste."

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"I'm still with you," Rex said, a bit impatiently.

The older man nodded again. "The thing is that as the industrialization gained, a situation similar to what was developing in the West presented itself. No more than the old type capitalist entrepreneur could manage a cosmocorps could politicians manage the Soviet Complex industrial explosion. Politicians cannot run industries, Mr. Bader. It takes scientists, technicians, engineers, skilled mechanics. It takes what you call Meritcrats. It takes men of high I.Q. and energy. Politicians often have energy, but it is surprising how few have a high I.Q. It is evidently not particularly necessary in a politician."

The following came out more slowly. "The Party and its bureaucrats, whether or nor sincere, are no longer of any value, Mr. Bader. We, of the element you call the Meritcrats in the West, are frustrated rather than helped by them. Obviously, the cosmocorps are the future. International borderlines are no longer valid."

"O.K.," Rex said. "So what do I report to Mr. Roget?"

The chairman looked around at his colleagues before replying. Some went to the trouble of nodding, but all kept their peace. They weren't a very talkative bunch, Rex Bader had long since decided. The chairman turned back to him.

"It will not be an overnight affair, but we must begin and the sooner the better. Urge Mr. Roget to push the internationalization of communications bill through your Congress. If and when it passes, whether or not the Party would like it so, there will have to be an international congress to discuss the matter. The Party will probably try to turn it down, but we of the Soviet Meritcrats will expend every effort to push it through. We suspect that the popularity of the idea will eventually see it triumph. When and if the governments of both the West and the Soviet Complex have agreed, a new type of cosmocorps will have to be set up, possibly in Switzerland. Very well, Mr. Bader, that cosmocorps will be our point of contact with our fellows in the West. There we will lay out our plans for future ventures. Perhaps transportation will be next. Tell all this to Mr. Roget."

"O.K.," Rex said. Then, "Just one more thing: What is Colonel Simonov doing here? It makes me a little leery to be having your secrets discussed in front of him."

Ilya Simonov spoke up. "There are a good many of my equivalent in the Soviet Complex bureaucracy, Bader. You see, even in a bureaucracy, if you're going to get the hard jobs done, you've got to expect the rising of a Meritocracy. Certainly, nepotism and favoritism prevail in the very highest echelons, but we who really do the work

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can't be semi-idiots. Many, many of us see the need to change the old and look forward to a world government based on the cosmocorps. Needless to say I'm among them."

"But this connection with Dave Zimmerman's people?"

"Is still in the early stages, but we're very interested in the ideas he urges. You've got to realize that when and if the Party is eliminated we in the Soviet Complex will have to establish new institutions. Obviously, at this late date we can't go back to Czarism, or even classical capitalism. Personally, I'm not particularly happy about your American one-earned-dollar-one-vote arrangement."

Rex said, "Would you have an unemployed ditch digger have as much say in the running of the country as, say, a nuclear scientist?"

Simonov shook his head. "No, I recognize the fact that all men are not created equal, in the sense that some can be, and are, of more value to the community than others. Why not do it this way? Every voter begins with one vote. For every unit of I.Q. that he has above one hundred he is granted another vote. A man with an I.Q. of 101 would get two votes. A genius with an I.Q. of 150 would have 51 votes."

"An interesting conception," the chairman nodded.

Rex shifted his shoulders in a slight shrug. "O.K. So for the time being, that is all?"

"That is all," the chairman said, and began to come to his feet.

The others stood, too, as did Rex and Ilya Simonov who came around to him. The meeting broke up into chattering groups.

Simonov clapped Rex on the shoulder in an amused comradely gesture and said, "Mr. Bader, you are a Machiavellian. Stalin himself would have been proud of you." He tossed his head back and laughed heartily. "Five hands of cards in the game? How could you lose?"

Rex had to grin back at him. "Colonel Simonov, you've obviously read 'The Prince' yourself. I suspect you've been aware of just about every conversation I've had these past few weeks."

The agent chuckled sourly. "Not quite all. With the ultra-modern scramblers utilized by, say, Mr. Roget, no bug can get through." He snorted contempt. "The smaller, portable ones such as carried by your two friends, Luis Costello and Harry Bellini are meaningless to our advanced equipment. They think they are scrambling all electronic devices in their vicinity. We merely unscramble them. We listen in to everything those latter-day hoodlums say."

Rex shook his head and returned the other's friendly clap, saying, "What a business to be in." Then he frowned. Was the other wearing

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a girdle. The Soviet agent didn't even remotely seem the swish type.

That worthy interpreted the look and laughed heartily again. "It is not a corset, Mr. Bader, but body armor. It has saved my life three times over. It would take a laser to cut through."

"Once again," Rex said. "What a business to be in. O.K., what's next? How do I get back to my hotel?"

"The same way you came," Simonov said reasonably. "By the original house trailer, the gypsy caravan."

He assumed that they returned him by approximately the same route as they had come. As before, the two guards, or whatever they were, sat in the caravan with him. After a short time he could hear the sounds of the festival's revelry outside. The sounds grew and eventually the vehicle came to a halt.

The blond one said, "You are now behind the Athenee Palace hotel. Miss Georgescu will meet you in the lobby. She will pretend to be upset over your disappearance. You can simply laugh and say you had a very enjoyable time. You can pretend to be a bit drunk, if you wish. You will go up to your rooms and this evening she will make her appearance once more and show you about town. In the morning, you will return first to Paris then to Greater Washington."

"So it's all laid out for me."

"Yes."

It progressed as they had stated. Ana Georgescu was terribly upset and apologetic. Rex laughed, on cue. They made their plans for meeting that evening and he proceeded to his suite, looking forward to a bath, a drink and a change of clothes. It had been an eventful day.

The drink he shortly had in hand but the bath and change of clothes had to be postponed. He had hardly dialed himself a *tsuica*—the stuff was already growing on him—before the identity screen on the door hummed.

He activated it and the face of Luis was there.

"Oh damn," he said.

He considered refusing entry. But no. He would have to find out what the other wanted. He flicked the button that opened up.

Luis and Harry entered, followed by Tag Dermott. Rex Bader was taken back by the third visitor. There had been some strange lineups, an ultra-hash of double-dealing in this whole mess, but he hadn't expected cooperation between the Inter-American Bureau of Investigation and the descendants of the Mafia.

"O.K.," he sighed. "Get yourselves drinks if you want and sit down. To what do I owe this honor, gentlemen?"

Harry looked at him coldly. "No smartness, Bader."

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"Sorry." Rex looked at Dermott.

Tag Dermott, ignoring the invitation to a drink, sank onto a couch and returned the look, his face as cold as those of the two Diversified Industries men. He said, "You've been with the people you were sent to contact." It was a statement, not a question.

"That's right."

"What did they say?"

Rex Bader thought about it for a moment.

"Speak up," Luis rasped. "You've been paid, Bader. Deliver."

Rex said, "They were interested in Roget's proposal. They want to get together with him further."

Tag Dermott muttered something under his breath.

Harry said softly, "What're their names?"

"I don't know. No names were given."

"Where'd you meet them?"

"I don't know. I was taken there in a closed vehicle."

Tag Dermott leaned forward. "Listen, Bader. We're under orders to foul up this whole proposition before it gets any further. We want the name of someone as high up, over here, as Roget is back home."

Rex looked at him speculatively. "You know, I doubt if you're working for John Coolidge. This sort of thing isn't his style. He might be against the cosmocorps bit, but he wouldn't condone assassination, or whatever you three have in mind."

Dermott said, "That's none of your business, Bader."

"I think you've sold out to Sophia Anastasis."

Harry grunted humor. He, too, had taken a seat. He said, "Look who's talking about selling out. You'd sell out your own mother in spades, Bader. Come on, we need a name. Somebody to hit. Somebody big enough that it'll cause such an international stink that this communications merger will be shelved. You must have seen somebody there that you can finger."

Rex said, "You have your scrambler working?"

"Of course."

"So nobody can be listening in on this?"

"I told you it was working."

Rex said slowly, "Then there's only one I can think of."

"He's a big wheel here in the Soviet Complex, and somebody connected with this operation?"

"Very much so."

"If he was knocked off, obviously by someone from the West, it'd cause a big stink?"

"It would cause one hell of a stink, resulting in the arrest of a whole batch of American agents in the Soviet Complex, which would be followed by the arrest of a whole batch of Soviet agents in the West. Relations between East and West would be in an uproar."

"Great," Dermott snapped. "Who is it?"

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"Colonel Ilya Simonov. If I have the picture clearly, he's one of the top activators in this scheme, and he's also a top Soviet bureaucrat."

"Do you know where he is now?"

"He's in town, somewhere in Bucharest, otherwise I don't know."

All three came to their feet.

"We'll find him," Luis said emptily.

After the door had closed behind them, Rex Bader looked at it. "I'm afraid he'll find you first, boys," he said.

Aftermath

Rex Bader was seated again in the office-sanctum of Francis W. Roget, Chairman of the Board of International Communications, Incorporated. As before, the only others present were Roget, himself, and his assistant, Temple Norman.

"So that wraps it up," Rex Bader was saying. "I returned their money to both Coolidge and his group and Miss Anastasis—by phone, of course. I didn't see them. I reported the truth. I hadn't learned the names of any of the group you wanted contacted. I didn't add that I hadn't tried. I fibbed a bit, perhaps, when I told Miss Anastasis that I didn't know what had happened to her two men, Luis and Harry. She intimated that they had disappeared. Coolidge was irritated with me, but made no mention of his man, Tag Dermott. It's possible that he didn't even know Dermott was in Europe, he had evidently sold out to Diversified Industries."

Rex cleared his throat and wound it up. "I'll hold you to our agreement and keep your stock since I figure I did what you wanted. Your initial contact has been made."

Roget nodded. "We expected a little more, but you can keep the stock we advanced you. We had expected you to travel more considerably in the Soviet Complex, talking to quite a number of interested persons."

"As it turned out, it wasn't necessary," Rex said.

Temple Norman said testily, "It seems to me you did precious little to earn your pay."

Rex looked at him. "There's one other thing that I haven't reported as yet."

Roget frowned. "What's that, my dear Bader?"

Rex Bader kept his eyes on the magnate's assistant. "You mentioned once in that supercilious manner of yours that I was a detective and asked me what I had detected. Have you ever heard of Sherlock Holmes, Mr. Norman?"

"Of course. What are you driving at, Bader." The Temple Norman nostrils were aloft.

"Holmes once said something to the effect that if you rule out the impossible then what remains, no matter how improbable, is the truth."

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Francis Roget said in puzzlement, "Well, what seems so implausible but is the truth?"

"That your closest assistant, a member of one of the richest old families in the country, is a traitor who has betrayed you to either, or both, Coolidge and his group and Miss Anastasis and hers."

Temple Norman stiffened in indignation. "Are you insane?"

"I don't think so." Rex looked back at Roget. "This sanctum is unbuggable. You've said so yourself. So has Colonel Simonov, and he ought to know. Intelligently, you kept me and my mission under wraps. I've met nobody at all connected with your organization except Temple Norman and yourself. I doubt if you're the traitor, Mr. Roget. It doesn't make sense. But somebody leaked everything you told me, including our little system of passwords. There's nobody to do the leaking, except one of us."

His eyes turned to Temple Norman again. "It's not as implausible as all that. Inheritance taxes, capital gains taxes, corporation taxes and all the rest of it have been whittling away at the old great fortunes but they still exist. You may be strange bedfellows but both you and Miss Anastasis are not interested in the further growth of the Meritocracy and the cosmocorps."

He went back to Roget. "I suggest that you get yourself a new assistant, Mr. Roget."

The super-magnate turned to his secretary-assistant. "That will be all, Temple. I shall look further into this later."

"But, sir!"

"Get out!"

The other got.

Rex Bader stood erect. "I'll be getting along, too."

"No."

Rex looked down at him. "The job's done."

Francis W. Roget shook his head. "The story hasn't ended, my dear Bader. Just the first chapter. I have another assignment for you."

"Oh, *no*." ■

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PLACE	TITLE	AUTHOR	POINTS
1.	Wolfling (Part 2)	*Gordon R. Dickson*	1.59
2.	A Womanly Talent	*Anne McCaffrey*	2.06
3.	Extortion, Inc.	*Mack Reynolds*	3.56
4.	A Chair of Comparative Leisure	*Robin Scott*	3.68
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THE EDITOR.

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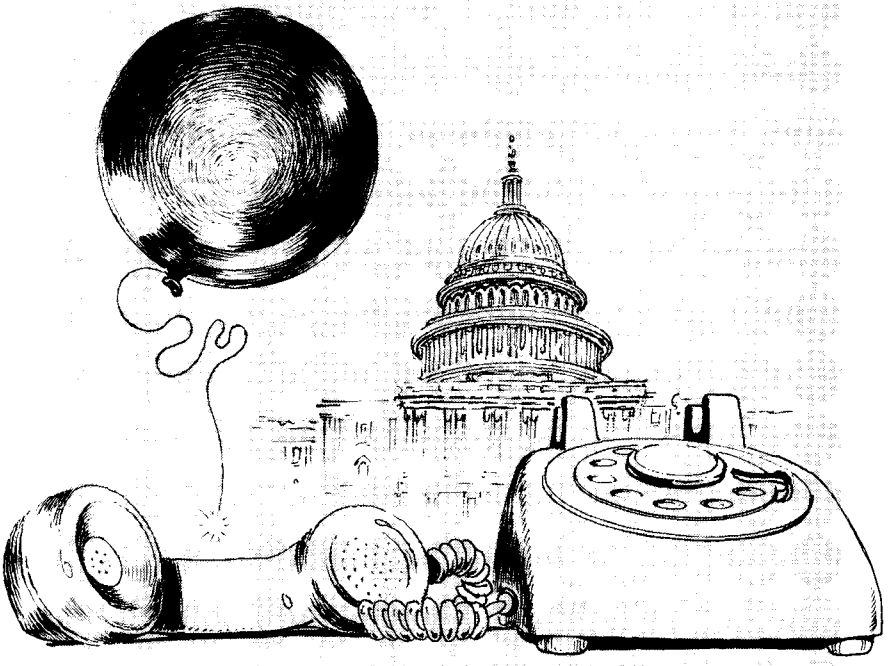
INITIAL CONTACT

PERRY A. CHAPDELAINE

In getting the meaning from an alien's message,
it isn't hard to get math and physics.
The problems start with terms like "I" and "mine"!
Wonder what a bee's idea of "I" is?

Illustrated by Kelly Freas



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Michael O'Hara, tall like a tree and gnarled like an old oak but still young, bent his head with deliberate timing and dignity toward his snapping breakfast food. With only one ear on his Sound-A-News, he scooped his spoon slowly forward in soup-eating half-circle, then stopped it suddenly as the news caught his full attention.

"Repeat the last half minute," he spoke aloud.

With no perceptible pause, the Sound-A-News picked out Michael O'Hara's meaning, shuttled near-pure light frequencies and subsidiary side frequencies back through crystal lattices then repeated its earlier news story:

"Flash! Flash! Project Ozma X reports aliens to invade Earth for purpose of enslaving all humans.

"Early this morning Sound-A-News analysts, along with reports from very reliable and reputable sources, determined Eridanian motivation. It is nothing less than a complete take-over of Earth. According to this reliable source, the Eridanians who plan to visit our planet two years from now, also intend to capture and enslave humans for their own evil purposes."

Michael dropped his spoon and, with uncharacteristic speed and agility, bounded from his seat, "Damn! Damn!" he swore.

The Sound-A-News carefully ignored the spoken expletives and continued in its own inexorable manner:

"News reports now coming from all over the planet indicate widespread concern on the part of every governmental agency. The President has called an extraordinary special cabinet meeting and all agencies associated with Project Ozma X are expected to remain at full alert, available for . . ."

Michael dashed through his kitchen at full speed, stopping only long enough to grab his briefcase lying at the foot of his table; not pausing at all as he ordered, "Sound off!" to his Sound-A-News!

Unwilling to risk the state of his muscular control now reacting from adrenaline following the subjective impact of the recent news, he signaled to an air-cab, bounded in and, half-shouting, said, "Ozma Building 24— Step on it, please!"

The copter-cab skillfully swung into its allotted line, pushed through to the speed side then, accelerated at legal maximum. Within minutes it drifted back to slow side, circled around in a large ellipse and softly settled on top of Project Ozma X Building 24.

Michael O'Hara jumped out, pushed his plastic identification pass into the first check point and leaned his briefcase against the doorway turnstile impatiently waiting for the automatic mechanism to release its prisonlike stance.

From the roof door to his office was only a matter of seconds—into the executive shaft, down four

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flights with quick deceleration, then step out through the blue doorway at the rear of the elevator cab.

Throwing his briefcase down at the first plush air-couch, he reached for the outer office switchbox without bothering to seat himself first. He pressed the most prominent button-depression, then spoke:

"Mary?"

"Yes, sir! Good morning, sir! You have an unusual number of callers this morning, Dr. O'Hara. There's Jake Sidstrum of News and then . . ."

"Cancel them all," he interrupted quickly. "Mary, don't let anybody less than the president, himself, in my office this morning. Even then I would want you to stall him off as long as possible.

"Next, I want you to come in here. Oh—lock your outer door first. Mary, this is a Grade A emergency. See that you do exactly what I say."

Mary Clibourne, petite, pretty but not unusually so, hair color changeable with the style, blue eyes, of devoted loyalty to her new boss, moved quickly to her outer office door and locked it tight. She turned to her auto-secretary to inspect its ready-status, flicked all incoming calls to automatic answer and standby, then, with only the briefest of looks at herself in her desk mirror, needlessly pushing her latest hairdo with the ends of her two fingers, she rushed into her chief's inner sanctum.

Michael O'Hara looked up from the papers now littering his desk top and asked: "Who gave them the news and when, Mary?"

"Gave what news, Dr. O'Hara?"

"About the so-called invasion from Eridani. Didn't you hear the news this morning?"

Quite at a loss to explain the departure her employer's questions had taken, Mary delayed her answer long enough to search through memories for any possible event of the last few days which just might explain them. Drawing a clear blank, she finally replied, "I came early this morning and I didn't listen to the news. I usually listen, but this morning I didn't feel like asking it to come on."

"Sit down, Mary," Michael invited. "This day will probably prove to be the most nerve-wracking of your career at Project Ozma. How long have you been here, Mary?"

"For twelve years."

"And I've been here but six months," he mused.

"According to the late morning news, 'unofficial, authoritative' sources have finally determined the Eridanian motives. When their starship *One* arrives two years from now, they intend to enslave mankind for some evil purposes.

"All Earth governments are disturbed and even President Ownouchai is holding special cabinet meetings."

Mary's mouth dropped open until, finally, an audible gasp issued

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forth as her breath suddenly stroked inward.

"I think you understand how silly the whole proposition is," Michael continued. "But with an election year coming up, tax burdens to consider and the usual four-year defense for Project Ozma budgetary requirements, whoever started this rumor picked on the right one. It's sure to create maximal nuisance and may even prove lethal to us."

"I'll call the Sound-A-News distributor and find out the source of their rumors," Mary volunteered.

"Not a chance. If they are politically motivated—a simple phone call won't do. And, if this is a genuine deliberately distorted leak from inside the project, they still aren't going to release their source of information."

"But why would people believe such trash, Chief? Hasn't Project Ozma given great value for value received? In the past fifteen years everyone has had their standard of living raised tremendously by our contact with Epsilon Eridani. And they are not much farther along technologically. Aren't they a Type I civilization—about 4 X 10^{20} ergs per second in energy consumption?"

"You know that. I know that. The scientists and politicians know that. In fact, any thinking man knows that the idea of enslaving mankind from 10.8 light-years away, using only Type I technology, is just plain stupid. But we aren't dealing with thinking men on this issue.

"As a matter of fact, we are dealing with the hidden fears, prejudices and hysteria of 'plain folks'. Who do you think the politicians will heed? The thinking men? Or, the numerically larger 'plain folks'?"

" 'Plain folks,' " Mary sighed grudgingly.

Outside, in Mary Clibourne's office, a red light flashed urgently; then, after exactly thirty seconds, light beams switched in hidden machinery, lesser priority controls were by-passed and the signal was shunted to Michael's office.

A red light in the panel before Michael's eyes began flashing. Were Michael to wait thirty seconds longer, the sound switch would also be activated producing a simultaneous noise of annoying frequency and amplitude, demanding, like the red light, attention.

"It's started already. You know who that must be. Answer it for me will you, Mary? Tell them I'm visiting one of our new construction sites and that you have already sent messengers for me."

When Mary finished her deception, Michael ordered an emergency meeting of all department heads.

First to arrive was John Doane, PhD, tall, middle-aged and scholarly of both mind and appearance. He was head of Communications

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and Cryptography, otherwise referred to as C and C.

Next was slightly balding Peter Machtrix, PhD, head of Language and Context, otherwise known as L and C, and understandably having a slight responsibility overlap with C and C functions.

Earth and Exo-biology's Negro chief, Samuel Chavits, PhD, and Physics and Chemistry's Polynesian chief, Win Lai, PhD, otherwise known as E and E, and P and C, respectively, arrived together.

Margaret Cleveland, PhD, the tall, severe looking, auburn haired head of Culture and Customs, known as Cu and Cu to avoid the obvious conflict with Communications and Cryptography's C and C and euphemistically referred to as "copper and copper" behind her back, arrived last.

Michael wasted little time on amenities. Explaining the gravity of the situation briefly, he asked each in turn if they knew the source of the so-called "authoritative source."

Only Win Lai had not heard the latest newscast but both he and the others quickly disavowed any news leak from their department.

Samuel Chavits summed it up for all when he said, "I've been with Project Ozma X for ten years, ever since the Eridanian star ship began its trip. In all that time, our department has cooperated fully with the news services, freely giving them every worthwhile deduction and useful information. We would have no reason for creating the hysteria. Neither would we have any basis for creating it."

Once again Mary Clibourne's red light flashed and this time it was promptly answered.

"Just a moment please, I'll see if they have found him yet," she sweetly replied.

Speaking the standard codeword toward her chief's intercom, after carefully disconnecting the incoming caller, she said, "Dr. O'Hara, he's on again. Have you been found yet?"

"No!" Michael quickly shouted. "Hold him off just a little longer, please!"

Turning back to his department heads he spoke again, "If I don't have the answer to this puzzle within the next few hours, I'm afraid Project Ozma will be in serious trouble, for the tenth time.

"The politicians are on our neck again which means we have got to pacify the public in some proper and reasonable manner. All of you must remember the history of the past nine Projects. The first Project Ozma in 1960 headed by the American radioastronomer Dr. Frank Drake, developed a 21 cm wavelength receiver for the detection of interstellar radio signals of intelligent origin. He chose the stars Epsilon Eridani and Tau Ceti, both of about eleven light-years distant, as the first objects of investigation, using his newly invented receiver and the 27-meter Bank antenna.

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Financial and time investments were small—a few thousand dollars and two hundred hours of listening time, to be exact."

Michael O'Hara paused briefly in his narrative, then turned to his C and C chief, "John, I'm going to push everyone as much as I can for a timely answer to the current news distortion, but for the sake of proper background for all, tell us about the first contact with Type II civilizations."

"Excuse me, Dr. O'Hara," Margaret Cleveland interrupted, "ask him to explain Type II and Type III categories, too. I've heard them before but we don't use such classifications in Cu and Cu."

Michael nodded to John Doane who easily picked up his portion of the conversation.

"The twenty-four year old Irish graduate student, Jocelyn Bell, original discoverer, a Mullard Observatory team at Cambridge University under Dr. Anthony Hewish and the American Dr. Frank Drake, at his Arecibo Ionospheric Observatory in Puerto Rico, both studied signals generated by a Type II civilization capable of utilizing and channeling the entire radiation output of our sun, about 4×10^{33} ergs per second.

"N. S. Kardashev, who you will all remember as an associate of the Soviet astrophysicist I. S. Shklovskii, at the Sternberg Astronomical Institute invented the categories Type I, II and III as measured by capability to control and output greatly different orders of magnitude of energy. Since Type III would represent a civilization with access to the power comparable to the output of an entire galaxy, some 4×10^{44} ergs per second, neither Type I nor Type III civilizations seemed like good initial contacts for our primitive society.

"Anyway, when Drake and others made their studies in 1968, they found signals which occurred at intervals of 1.337 seconds with a regularity far greater than that of any ordinary timepiece. The intensity of each pulse was highly variable over a period of one minute, then the emissions disappeared for three or four minutes; and, that cycle was continuous.

"At Arecibo, at a frequency of 111 megacycles per second, Drake discovered the pulses at peak power were one of the strongest radio emissions from space ever discovered up to that time and they came from points in space at least two hundred light-years away.

"These proved to be space beacons of Type II civilization providing deep space grids for their united transportation and communications network.

"Does that cover it, Michael?"

"That will do nicely, yes. Well, to continue, Project Ozma II began some years later. It would have been highly surprising had any discovery been made for the small investments of time and money in

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Project Ozma I. Politicians cut off the funds; or, at the least, refused adequate backing. I forget which it was.

"In Project Ozma II, listening times were expanded to include twenty spectral type stars G, K and F from 4.3 light-years to 22.0 light-years distance. This list also included Epsilon Eridani but produced negative results.

"Politicians killed it, too.

"Projects III through IX grew in stature to include listening throughout some three thousand light-years and also, in Project IX, began sending throughout an equal number of light-years. We tried to receive and send on Coconni and Morrison's 21 cm of hydrogen and the later recommended 18 cm wavelength of hydroxyl molecular fragment. We tried natural frequencies and their overtones as well as broad and short band shifts caused by possible Doppler effects when planets move in orbit. We boosted our power way beyond the reasonable theoretical limits of 10 kilowatts spread over 10,000 cycles per second to insure its reception and not once did we achieve the desired Type I civilization contact.

"As you all know, when Project Ozma IX was doomed by the politicians' financial ax some fifteen years ago, C and C received the first transmission from Epsilon Eridani."

Michael turned to John Doane again and asked, "Were you here then, John?"

"Yes, I was!"

"What was the nature of their transmission at that time?"

"As you well know, that's the picture on the wall above your

FIRST CONTACT—PROJECT OZMA IX
Epsilon Eridani

Exact message received in 667 Frank Drake code:

0000010000101010001111101000010000000010011111001100011010011
0001111100110101100001100011111000000000100100000111110000010
0001001010000000000000000000000000000 1000000000000000000000
0000100000000000000001100000000000000000000011001000000000
0000000000000000000000000000000001100100000000001110100000
0000000000100000100000000000001000011 0000000000000000010000
1101010010000000010000000000000000000 1000000001110000000000
0100000000000000000011100000000 1000000000100000000000000000
0000100000000000000000000100100000000000000000 1100000000000
0000010000011111111111111101000 1111111111111111001001001000
1100000001101000001000101000000101011000000010010000001001.

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head, Mike," John replied, nodding his head in the same direction.

"They sent us the standard Frank Drake binary 'yes' and 'no' type of signal in a series of pulse-no-pulses which included repetitive strings of 667 digits as shown below the figure. These were easily factored into two primes, 23 and 29, which signaled that either the picture—and it had to be a picture since most alien intelligences would be expected to be sensitive to light in some significant manner—was 23 rowed by 29 columned or 29 rowed or 23 columned. It proved to be the latter.

"For the sake of proper background in what promises to be a dirty political campaign this year, will you brief us on the first interpretation made of the picture?"

John pushed his chair back and walked to the large crossword puzzlelike picture hanging behind Michael's desk. Using his pencil he pointed as he spoke, "Here, in the far right corner is their sun and immediately below are four planets. Notice that the second and fourth are massive bodies beside the other two, probably like our own giant gas planets.

"Streaming off from Planet Three is a diagonallike line which moves directly toward the head of the alien entity which is found in the bottom right-hand corner. This indicates the being also comes from Planet Three of his four-planet system.

"Apparently the being has four legs and either mandibles, tentacles or arms extended from his anterior portion. On the dorsal portion are either ears, antenna, or extra mandibles, or tentacles or arms.

"Later information has refined our knowledge so that we now know that all four extended features are kinds of tentacles around an anterior brain case surrounded by light-sensing eyes.

"At the top of the picture are the Bohr-like pictograms representing. respectively, hydrogen, oxygen and carbon telling us that the alien is composed primarily of these ingredients and that it lives in an oxidizing atmosphere similar to ours—at least we are now sure of this—and also, by use of the out-of-date Bohr-like atoms, telling us that his technology level must be close to ours.

"Immediately below the hydrogen atom are the binary numbers 1, 2, 3, 4, 5, 6 and 7 modified by the two parity checks seen after 3 and 5 to force every number as an odd set of pulses.

"Immediately below the number 7 was this undecipherable symbol," here John lowered his pencil to the bottom left corner, "which we have subsequently learned represents the alien's name for itself, much as we call ourselves by the symbol 'man'.

"Frank Drake of Project Ozma I invented this type of cryptograph and it was the same type which we used in Project Ozma IX sending

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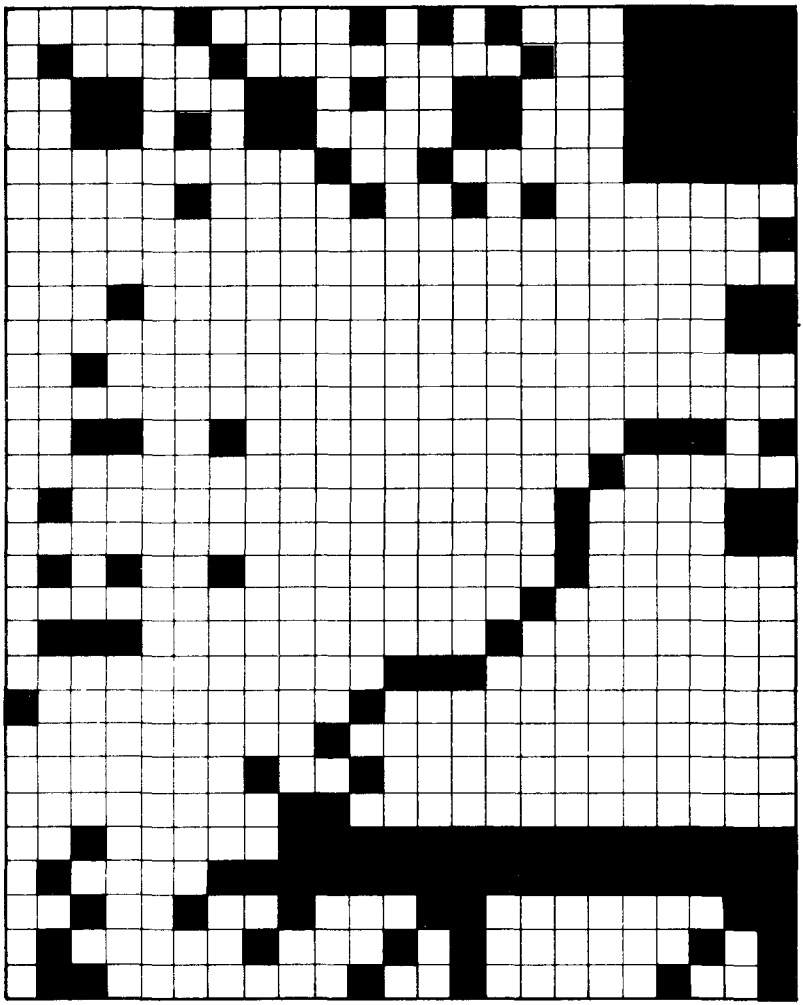
information out toward Epsilon Eridani. We can only conclude that the Eridanians deciphered ours and then used the same scheme to initiate communications with us."

"But was there any unusual context to their early messages?" Michael asked insistently.

"None that we are aware of. They have all been perfectly



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straightforward and in the best tradition of Drake, Carl Sagen and Shklovskii."

Mary opened the door to look over the assemblage hoping that she could speak to Michael without undue interruption to his conference.

Michael looked up and asked, "Yes?"

"Dr. O'Hara, I'm terribly sorry to interrupt you again but the President is back on the line. I wanted you to know that I told him you had left the Antarctic base for C and C's satellite on the far side of the Moon. He's sure to expect to hear from you soon and I must admit I overlooked the little matter of how to explain your sudden re-appearance back on Earth when you do call him."

"Never mind, Mary, I'll think of something when the time comes. Oh, and thanks."

As Mary still held open the door, he asked, "Is there anything else?"

"James Conway of E and E has been trying to get hold of Dr. Chavits for about ten minutes. He says if Dr. Chavits is not available, he must talk with you."

Michael turned to Samuel Chavits to ask, "Anything so vital that we must interrupt this conference, Sam?"

"Not that I know of, Mike."

As Mary closed the door, Michael O'Hara turned to Margaret Cleveland, "You came here next didn't you, Margaret? About ten years ago wasn't it?"

Margaret confirmed the statement adding, "That's right. The Eridanians hadn't begun to send Cu and Cu information for about a year. Then, suddenly, a whole flood of textbooks arrived that puzzled C and C, E and E, and P and C as they were then organized.

"That was about the time that Peter Machtrix formed up L and C with Language and Context holding top priority until semantics made sense. Actually, I started with Peter here," she nodded at her former supervisor, "but found my interest to be more in line with Culture and Customs once we had deduced that their incoming materials involved concepts in that direction."

"What was the first valuable information to be sent to us?" Michael asked the group in general.

Win Lai removed his thick lenses before speaking. Everyone around the table automatically looked toward him. "I didn't arrive until about five years ago but I understand that my predecessor sent the equivalent of our total chemical and physical knowledge once fast-time was invented by C and C. Actually, as I understand the problem of communication time, the radio waves traveled at light speed but the information, the semantic coding, was indexed at about 10^{-2} that of light speed causing the normal 10.8 light-year lag to be con-

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siderably exaggerated when exchanging information.

"C and C came forward with their text scanner enabling us to encode all of our ordinary natural science texts directly through the Ozma transmitter in the agreed upon binary Drake coding."

"Didn't the same device work for our biological texts?" Michael asked Samuel Chavits.

"Yes, up to a point. But whenever we tried to encode arbitrary classifications we bumped into the Cu and Cu problem as well as the L and C problem. So long as we stuck with 'pure' science, the encoder worked just fine."

"But what was the first valuable information to be sent to us?" Michael repeated.

"I meant to add that their textbooks in the natural sciences came first but we had to wait on C and C's semantic coder before we got much use of them—or so I have been told," Win Lai answered.

Michael spoke, apparently to no one, saying, "Get the coffee urn working, Mary."

His sensitive speaker shunted apparently endlessly circling electrons outward and they, in their turn, triggered light-beam switches which activated Mary's speaker repeating his message. Mary opened her drawer taking out a fresh package of coffee as was her custom.

"Am I fair in asking if a goodly proportion of our technical knowledge has either been sent or is unretrievably on the way to Epsilon Eridani?"

Everyone nodded their assent.

"How well do they know what we are like?" he asked of Samuel Chavits.

"Well, we sent our DNA-RNA structure some twelve years ago. And we have sent considerable quantities of organic chemistry, but we aren't exactly sure what they were able to make of our evolutionary information which dictates so much of the way our biology and behavior operates."

"But it was sent?" Michael persisted.

"Yes."

Mary brought coffee to all and another message to her chief. "I've been able to hold off the Presidential office all right but James Conway is outside and he claims he's going to sit there until he sees someone of importance no matter how long he must stay."

"All right, Mary. See if you can find out what he wants. Also, bring him some coffee. He might as well enjoy his wait, too."

Michael took his first sip, scowled slightly, then said, "O.K., that sort of sums up what we have done. We've assumed from the start that Epsilon Eridanians were not inimical and, even if they were, could not harm us from a base 10.8 light-years away.

"When did they send off the star ship? About ten years ago, wasn't it?"

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They all nodded in the affirmative.

"What do we know of it, Win?"

"It's fast; based upon their dense-photon physics, it can accelerate to near light-speed in a matter of only one year and decelerate in about the same time. It can't be much bigger than fifty by one hundred and twenty feet. It's made of lithium molecules frozen tight by their wavicle iteration patterns. When we tested the material we found it to be an excellent pseudo-dense screen for either fast or slow particles.

"It was probably assembled in orbit since their planet is considerably denser than ours by a factor of 3 Gs. We know nothing about its possible armaments or other offensive weapons.

"We were told that only ten aliens inhabit the ship and that their atmosphere would be approximately equivalent to ours but that its density, naturally, would not be. I don't imagine that they will be able to live very well in an unpressurized atmosphere will they, Sam?"

"No, so far as we know, they will need to maintain residence inside their ship or an equivalent pressurized chamber. We have been preparing several for them scattered around the globe at various vantage points."

"Is it the general consensus of everyone here, then, that we have no evidence of any inimical intent?"

Everyone nodded in agreement again.

"So much for what we sent out. Now, what have we gained in return?"

Peter spoke first, "Language and Context was the first to gain sudden large chunks of knowledge. For the first time in human history we were able to separate language, its context and human behavior. Mathematics, too, grew a thousandfold. We have made great strides in communicating to our own plant and animal life, now able to understand their behavior patterns as kinds of language. I would estimate, off the top of my head so to speak, that we have advanced several thousand years in this direction."

Win Lai added his portion next, "We can second that estimate in our field, Chief. We have sufficient material to keep us busy for at least a thousand years, now, and every bit of it either supplementary or complementary to our own knowledge. Crystal light switching which enables our electronic devices to work at light-speed is a trivial minor fallout since we already had equivalent principles; but, theirs promises to help solve the gravity-space-time conundrums.

"Information storage in single-atom reverberating units and indefinite sub-space power units seem to be just around the corner; we almost have, but not quite, the complete secret of psi phenome-

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non. Is it necessary to go on?"

"Sam, what about you?" Michael asked.

"Longevity is just about assured along with near-ability to synthesize large protein life forms up to and including man. As a matter of fact, we have progressed to the point where we are now working on synthesis of exo-biological molecules and their supporting structures."

"To sum it up, then, except for the understandably lagging Culture and Customs department, we have gained at least as much, if not more, than we have given. Is that correct?"

Again all nodded in the affirmative.

"And everyone here is absolutely sure that the only possible news releases from his or her department were standard formal statements just like those given out for the past fourteen or fifteen years?"

Michael looked at each of his department heads, squarely in the eyes, waiting for each affirmative nod.

"All right. Here's what I want all of you to do. Go back to your department and find out exactly what we sent to Epsilon Eridani 10.8 years ago. Send it to me in detail form along with a summary, immediately. Also, send along every news release stemming from your department in the past three days I want those in detail also.

"Oh, Margaret! Stay a moment will you? I want to get your rundown on Cu and Cu's progress."

Mary entered as soon as the other department chiefs had left. She closed the door behind her quickly saying, "Dr. O'Hara. The President has made contact with the latest flights to Project Ozma's Moon satellite and found you weren't there. I apologized and told his secretary that I had misunderstood your earlier message. But I'm not at all sure what to do now."

"Tell him you've located me at my hunting lodge and that I'm on my way into the office now. You expect me in about an hour and a half.

"Oh, Mary! Have you listened to the latest news?"

"Yes."

"What's it like out there?"

"Pressure seems to be getting heavier. The public hasn't bought the story outright but a clear-cut explanation better be forthcoming soon or our necks are on the block. Even then, according to most commentators, it's doubtful that Project Ozma X can be saved after this hysteria."

"Have they released any more information on their source?"

Mary paused with a long drawn out "Nooo! They did mention the ridiculous idea that animals, shaped just like humans, were already being synthesized by the Eridanians for purposes of slavery."

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"Get me a summary from the Sound-A-News. And thanks again for getting the political powers off my neck for a while. I think I'll either have an answer for them or go down with the boat within another hour and a half.

"Oh, yes! Bring Margaret and me another cup of fresh coffee."

Turning back to his remaining department head he asked, "Margaret, what seems to be the major contributions of the Eridanians to our understanding of culture and customs and vice versa?"

"Well, Dr. O'Hara, it's a real tough problem. What we have in common with the Eridanians are the elements carbon, oxygen, hydrogen and other like chemicals. From there on out it's all uphill. It's sort of like saying we have the constituents of the sun in common, therefore we ought to be able to compare our behavior.

"It just doesn't work out that easily!

"They have four tentacles, we have two hands. They have four legs, we have two. They have more eyes. They live on a heavier planet, their science is about forty years ahead of ours and their evolutionary patterns start with just grossly similar proto-proteins, then diverge sharply under different conditions of temperature and pressure.

"They *did* begin in the seas as did we. But our attitudes and behavior patterns, which can easily be traced back to the first protoman protozoa and through each successive evolutionary layer of fish, mammal and ape, bear no resemblance, superficial or otherwise, to the Eridanians.

"We don't even have equivalent biological counterparts in our oceans and continents to point to so that we can say, 'That is like the shape which the Eridanian once passed through.'

"Oh sure, I know what the public thinks in terms of biological analogs, but the truth is that news-release descriptions are purely analogs.

"Man identifies his personality and survival characteristics with his territory. Feelings of possiveness are strong for those things which he identifies as 'his' or 'his home'. Over ten years ago we attempted to communicate 'territory possiveness' to the Eridanians and you know the reply that we recently received?"

Michael reached for his second cup of coffee, turning to Mary as she said, "James Conway changed his mind about seeing his own chief. He will settle for only you, now!"

"O.K.!" Michael sighed. "Send him another cup of coffee and tell him to please wait."

Turning back to Margaret as though the conversation had never been interrupted, he said, "No, what did they send back?"

" 'Territory possiveness' was associated with the concept of a 'subset of a set'.

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"At least that's the state of our art now. We were all depending on the spaceship and its crew for providing the contacts which would help us build a knowledge base in culture and customs."

"O.K.! Margaret, send that material up with your other material, will you?"

Margaret left and, before Michael O'Hara could begin his nervous pacing, the first of his department heads' reports began to flow through his desk reproducer.

Over ten point eight years ago, according to his reports, we had transmitted the full text of Einstein's Special and General Relativity Theory, the then new Unified Particle Physics, large protein synthesis and Medelsohn's "Complete Topologies."

Within the past several weeks we had received photon-nucleonics; inverse electromagnetic spectrums; some as yet undecipherable materials seemingly related to philosophy, or maybe related to religion, or perhaps related to something totally alien, along with Margaret's previously referenced 'subset of a set' conundrum; a schematic picture of a human-shaped being along with chemical and physical descriptions of human associated biology.

The latter two pictures were placed aside while Michael surveyed Project Ozma X's daily news releases.

There seemed to be nothing detrimental in any of the reports: P and C had reported that inverse electromagnetic spectrums were giving some trouble since photon mass appeared to be infinite contrary to man's normal interpretation; C and C was experimenting with pulsed gamma rays; E and E had given no report during the past week, but the week before had published an exotic article on Eridanian protein synthesis.

Michael noted the author's name was "James Conway, PhD, of Department Earth and Exo-biology, Project Ozma X." He placed the article with his small, but growing papers of interest and spoke, "Mary, is James Conway still outside?"

"Yes, Dr. O'Hara."

"Tell him I'll be with him in just a few minutes."

The final release came from Cu and Cu which included only the decipherable portion of the maybe-philosophy, maybe-religion text along with the pictogram of the human shape in Drake code. This, too, he placed in his pile of interest.

"Let's see." As he spoke to himself the desk phone ignored his comments. "Ten years ago we mailed to them our fundamental chemistry and the textbooks needed for their understanding. We also sent them Medelsohn's 'Complete Topologies.'

"This week we received their first reaction to our ten-year-old comments: A human shape with

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proper instructions for complete chemical and physical synthesis of same; and, 'subset within a set' along with an undecipherable philosophy which is apparently in Culture and Customs line of interest."

Michael sipped his coffee, half-thinking, half-talking to himself, "I sense something important tying these things together but I'm not sure what. Could their 'philosophy' actually be a branch of mathematics? What would 'subset within set' have to do with territory defending animals? If P and C is confused over something as simple as photons of infinite mass, how can any of us be sure of what we have?"

"Mary, send James Conway in." Michael spoke impulsively with sudden intuitive feeling.

The very young and handsome research worker came rushing through the door carrying manila folders and lab reports. His black hair was well combed, his shoes well shined and his suit neat. Otherwise, his pince-nez type glasses contrasted sharply against his rounded facial features giving every impression of one who had definitely *not* the deep-study characteristics which he really had.

"Dr. O'Hara," he shouted with great enthusiasm. "We've cracked the code! We've cracked it! I knew you would want to be the first to know."

"Whoa! Slow down, Dr. Conway. What code have we cracked."

James Conway skidded to a stop against the Project Ozma X director's desk. He blinked several times as if to say, *Does he really not know what we are doing? Especially when it is so important!* He removed his pince-nez glasses, wiped them against his top jacket and deliberately replaced them with some final adjustments before speaking again.

"Why, the Eridanian code, of course!"

"I thought we had cracked that code back in Project Ozma IX?" Michael began to worry about his biologist's sanity.

James Conway blinked again, then, as though he had finally come up for air from the deep depths of a black pool of water, he spoke, "I'm sorry, Dr. O'Hara. In our department, the 'code' is the genetic code of the Eridanians. They sent us their biology chemistry about the same time that we sent them ours. We have just now determined its chemistry and can now reproduce the Eridanian in complete detail. I thought it sufficiently important to tell you as soon as we were sure. I told Sam on his way out."

Michael thanked his excited employee, asked for a detailed report, to be immediately forwarded, and returned to his puzzle.

Grateful for the insight which had turned his attention toward Conway, he spoke once again, reaching for, he hoped, the last

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piece in the puzzle. "Margaret Cleveland?"

His vocal tone was matched against a million other arrangements of the same vocal symbols, light rays again re-shunted electron flows and the speaker in Cu and Cu awoke to ask for "Miss Margaret Cleveland, please; Dr. O'-Hara calling."

Margaret spoke immediately, "Here, Chief."

"Who interpreted the 'subset within set' statement, Miss Cleveland?"

"I don't know, but I'll find out."

"Never mind! Was it someone in your department?"

"Yes! I'm sure, since no one else could make sense out of the whole message they threw it to us as they usually do."

"O.K.! Get Peter Machtrix in L and C to personally go over that whole text. Tell him I want to know if it could be some form of 'pure' mathematics, like Einstein's Theory of Relativity was 'pure' mathematics. Tell him I need the quickest answer he can formulate. Say, twenty minutes."

"Right, Chief!"

Michael turned back to his intercom and spoke again, "Mary, send some sort of snack over. I'm burning up more nervous energy than I'm putting back in. Another coffee will do, too."

Michael turned back to his papers shuffling them first one way then another but always coming back to his original hunch. Any conversation carried out over a time lag of ten point eight years is bound to be tedious. And this one must be a real dilly this time.

Margaret called back to say that she had found a modified form of the news release from her department. Everyone of Earth's messages ten years back was routinely matched against messages received from Epsilon Eridani and this one had been no exception. The Sound-A-News analysts had taken Cu and Cu's first exploratory conjectures regarding cultural behavior patterns and their basics—particularly the human primate's drive for territory defense—sent out ten years ago, and placed them alongside the answering communication involving both the human shape and its synthesizing chemistry and the very ambiguous messages which were assumed to be philosophical at the time of its release but perhaps might be religious or, now by Michael's guess, might be mathematical.

Margaret finished her summary, then added, "That statement on 'subset within set' wasn't quite complete when it went out.

"A 'closed set within a closed set' could easily be interpreted to mean that one Eridanian controlled another in his culture. Or that one Eridanian protected his territory and those who were subservient to him. That's the way it would make sense for us.

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"But, it was supposed to have read 'open subsets of an open set'."

"I still don't understand!" Michael responded.

"Well, every junior high-school kid knows that both the union and intersection of open sets results in sets which are open!" she declared.

"You'll have to be clearer with me than that."

"Well, *goodness,* Chief! How can the Eridanians be territory-protecting creatures if everyone's territory is open to every other person?" Her tone, like that of any specialist, was filled with sympathy for the poor generalist who could not understand the very basics of one's field.

"That does it Margaret. I've got the answer, I think. Prod Peter up, will you?"

Peter rang back within minutes.

"I can't give you an exact analysis right now, but I think you hit it on the head. It wasn't a philosophy. Or rather, it was a philosophy, like Einstein's theories were philosophies backed by formal mathematics. I've got Win Lai in P and C going over it and he says that it looks like the Rosetta stone for untangling inverse electromagnatic spectrums. He's having a hard time adjusting to the new concepts though, and plans to hire some new college graduates with more flexible imaginations."

"Thanks, Pete. I think everybody can relax now. I believe I've got the story. I won't guarantee to maintain our budget but I believe we can sustain ourselves." He closed off quickly then spoke again.

"Samuel Chavits of E and E."

"Samuel here!"

"Listen Sam, I just talked to James Conway. Is he for real?"

"What do you mean?"

"Can your outfit actually reproduce the complete biology of the Eridanian as Conway claimed?"

"If he said so, I'd believe it, Mike. We've always been pretty well up on their biology. It was only their basic genetic code which caused difficulty. I think we can. I knew Conway and his group were working on the problem but didn't expect it to be solved this quickly."

"O.K.! Thanks, Sam."

"Get me C and C, John Doane."

"John, here!"

"Get ready to prepare an interrupt message to the Eridanians. Do you still have the beam on their ship?"

"Tighter than ever."

"I want two messages prepared. First, see James Conway and get his Eridanian genetic code translated along with a picture of the Eridanian. Prepare a second message to divert the Eridanian ship to our satellite around Mars."

"Will do!" John answered quickly. "Anything else?"

"Yes! Starting today, I want you to begin applying your Com-

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munications and Cryptographic knowledge to communicating to human Earth people. Your first public relations budget will include manning for a dozen personnel including a working member of all the other departments. I want emergency action on the organization and from now on, all news releases will be channeled through your department."

Mary interrupted the conversation—something never done before—to say, "The President of the United Nations is on the phone, Dr. O'Hara. Will you take his call now?"

Michael signed off from John and spoke to his desk speaker, "Michael O'Hara here."

"Dr. O'Hara, we all are quite concerned over the latest news release. I *do* hope you have some additional information on the subject."

"I can give you the whole story now, Mr. President. I'm sure you will understand when I tell you it was poor public relations and only that. I've already taken steps to see that it doesn't recur.

"We didn't tell the press that Eridanians were to invade and enslave Earth people but I'm sure that some of our unscreened releases might have given the news analysts the material which could be twisted in that direction.

"You see, sir, over ten years ago, we transmitted the human genetic code along with attempts to begin conversations involving mutual behavior and customs. It must have taken the Eridanians only months to interpret our genetic code and to project the details of our anatomy and physiology. They *are* about forty years ahead of us you know!

"The news analysts associated their answer, which arrived only several weeks ago and which stated that they had received and understood our biochemistry, with portions of an answer involving abstruse mathematics and part of their descriptive material on culture and customs.

"Project Ozma X's news releases failed to accurately release a portion of their 'culture and customs' answer which was supposed to say something like 'open sets within open sets'. That's a crude approximation but, when we described the idea of personal territory, or personal property, eleven years ago, they answered with their own mathematical text and the concept of 'open sets within open sets'—they were telling us that they laid no claim to personal ownership of property or space—kind of like our American Indian who felt that all territory belonged to whoever wished to use it for the moment.

"The news media was given the text in the form of 'closed set within closed set', which was a mistake, and this improperly translated into 'We control all within our

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territory.' *That* idea coupled with their acknowledgment of understanding over our genetic structure, as well as their stated ability to synthesize the human protoplasm and form, led the news media to make the false assumptions which they did.

"Believe me, Mr. President, they are *not* planning to enslave the human race. The whole idea is absurd."

"I believe you," the President responded, "but the issue is too dangerous, politically, to ignore. What can you do to stop it?"

"I've already prepared the message that will do it, sir. We will simply transmit our knowledge of their genetic pattern back to Epsilon Eridani. Eleven years from now, they will realize that they, too, can be duplicated by us and that we have solved their protoplasmic synthesis. But more important, our people will immediately regain some feeling of superiority once they realize it is in our power to create the alien, and, therefore, they will drop their atavistic fear of enslavement by them."

"That won't stop the ship, Dr. O'Hara, and the ship is where the people feel the danger lies."

"I've directed that they land at our satellite around Mars, Mr. President. We just won't let them land on Earth or anywhere near Earth, sir."

"I'll expect your written report on the matter, Dr. O'Hara and, oh yes, I don't believe we will be able to increase your budget this year. With some luck, I think I can maintain it though."

Michael smiled once the connection was broken. *"The UN President is getting old,"* he thought. *"His hair is graying and his face is more lined. It was quite noticeable how he failed, completely, to spot the doors that I left ajar. Given one full year of decently controlled public relations through C and C and we will have the Eridanians on Earth, treated as great peace-friends of all mankind.*

"It is time that Project Ozma began applying its knowledge for its own protection."

Meanwhile, the elderly, graying President turned away from his recent conversation with the Project Ozma X director with interesting thoughts of his own. *"Project Ozma pulled itself out of that one in good shape. These young Project directors are all alike—think they are the originators of political subterfuge, double-talk and misdirection.*

"Sure hope his new public relations department can get those Eridanians down here and welcome within the next two years. I'd like to see and meet one myself.

"Anyway, it's about time that experts in communication began using their information for their own self-protection!" ■

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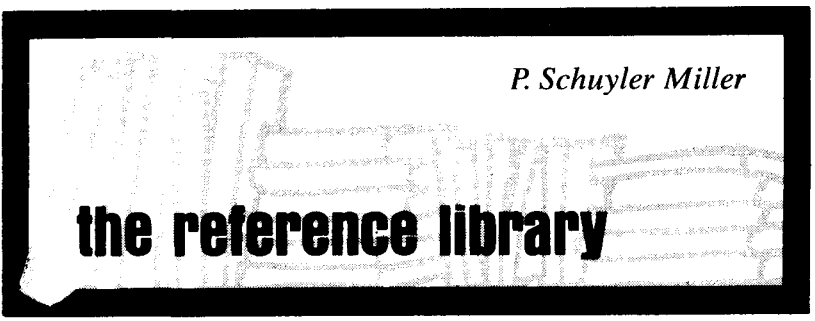

THE INDEXES

Making bibliographies has to be a labor of love. The work involved is fantastic, complaints about omissions and errors is vitriolic, and there's no money in it anyway. Regular publishers laugh boisterously at the very idea of publishing anything of the kind—unless, of course, there's a suitable subsidy forthcoming. The greatest continuing bibliography I know—*Chemical Abstracts*, published weekly for the American Chemical Society—is heavily subsidized, costs subscribers $1,200 a year, and still loses money. (It publishes about a quarter of a million abstracts each year, gleaned from more than 8,000 journals by some 3,000 abstractors of all nations.) The Soviet government is said to maintain an abstracting service covering *all* sciences and all languages for the benefit of its scientists, but I haven't heard that it is a published index.

There have been many great and famous bibliographies in the fields of literature and the humanities, of course . . . but a professor can get the real donkey work done for nothing by students, with funds from a foundation for the odds and ends and assured publication by his university press.

Yet for years science fiction and fantasy readers have been compiling and publishing bibliographies in their own time, at their own expense, and doing a job that the subsidized professor or PhD candidate would boast about if he'd done it, or had it done for him. Two new

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ones are just in as 1968 ends: "The Index of Science Fiction Magazines: 1951-1965," compiled by Norm Metcalf and published by J. Ben Stark of P.O. Box 261, Fairmont Station, El Cerrito, California 94530 for $8.50, and "Index to the Science Fiction Magazines: 1967," compiled by Anthony R. Lewis and published by the New England Science Fiction Association, Box G, MIT Branch Station, Cambridge, Massachusetts 02139 for what I take to be $1.00 (no price is given, but that's the price of a forthcoming 1966 index).

Older readers will come to attention when I tell them that the new Metcalf/Stark "Index" is a continuation of the great "Day Index" which Donald B. Day of Portland, Oregon brought out in 1952, covering the contents of most of the science fiction and fantasy magazines published between 1926—the first issue of *Amazing Stories*—and 1950. Where Day had author-and-title listings for some 47 magazines, the new index covers 77 and is about 50 percent longer. Norm Metcalf, whose files must be fabulous—as is his memory—has had a good deal of help and acknowledges it. For good measure, he tosses in approximations of the length of each story, information on pseudonyms, artists, editors, et al. On the minus side, the printer has omitted the various section headings for which the publisher left room—you can write them in, and the table of contents will help you find what you want.

The younger crew will be pleased to know that the 16-page multilithed NESFA index is the first of a series of annual companions to "The MIT Science Fiction Society's Index to the S-F Magazines, 1951-1965." This was the second bibliography published by the Massachusetts Institute of Technology gang and compiled by Erwin Strauss; where the first version had covered only 8 magazines, this covers 102 *titles* in English. However, the MIT index uses a different code symbol for each change in title of each magazine, whereas Metcalf lumps all the incarnations under one code notation, so they are covering just about the same magazines. MIT also threw in an issue-by-issue magazine-by-magazine table of contents . . . but they based their indexing on the magazines' printed tables of contents, and missed some editorial changes, including a story of mine!

Science fiction and fantasy bibliographies *are* labors of love, as I said in the beginning. Unless you've tried it, you have no idea of the work involved in compiling such a list, especially if you have to go back and catch up on magazines you've missed or have never seen. (I am appalled at the number that apparently never were on the stands in Pittsburgh—or anywhere else I've been since 1950. Some I had never even heard of.)

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I can tell you that I have made and will make good use of the books—especially the Metcalf/Stark volume, which lists the individual stories in major series as completely as possible. There are exceptions: "Cordwainer Smith's" stories and A. Bertram Chandler's "Rim" stories aren't listed as series because just about everything they wrote meshes into their private universes somehow, and because I suspect not even the authors know in what order the stories come.

The original "Day" index wasn't the first of its kind. I have parts of a looseleaf listing, not cross-indexed, to many individual magazines which Robert Peterson of Denver, Colorado published up until some time in 1948. "Doc" Lowndes, editor/publisher of *Famous Science Fiction* and several other reprint magazines, published a series of indexes in his fan magazine long before that; they have been used by later compilers, but I don't think they covered everything he did. Bradford Day of New York and environs began in 1953 with his mimeographed "Index to the Weird and Fantastica in Magazines," which added a number of important magazines that Don Day hadn't covered, such as *Weird Tales* and the Munsey publications. He has gone on to publish many more useful collections, which I've tried to list here if I've seen them and if they applied to the kind of science fiction Analog publishes.

If you have a back file of SF magazines, and if you use them, these indexes are invaluable. Paperback publishers don't always credit the original source of stories they reprint, but I try to find them with the three-foot shelf the fan bibliographers have provided. This department *does not* review fanzines per se—publishers please note—but I will try to list any decent bibliographical work that comes along, provided I get a source and a price that I can pass on to our readers. (I have omitted some foreign indexes—the amazing output of the Australian, New Zealand and Tasmanian fans is in this issue—only because no U.S. source was given. I don't get 'em all, but I try. In fact, a straight list of the indexes I have and use would very nearly fill the space I've taken up. Some day, I trust, some fan will publish an index to the indexes. Then I'll know what to look for next time I get into the hucksters' corner at a convention.

CONVENTIONS AND SUCH

Since this is not a fan column, I do not try to give you the schedule for all the many, many local and regional science fiction conventions held throughout the country and abroad. The only ones we can handle are the National Conventions.

The big one, the World Convention, will be held this year in St. Louis. It's the 27th, and the first for

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the St. Louis fans. Dates: August 29th through September 1st. Place: Chase-Park Plaza Hotel. Guest of Honor: artist Jack Gaughan. For full and continuing details, send $3.00 to St. Louiscon, P.O. Box 3008, St. Louis, Missouri 63130. It'll cost an extra dollar if you attend, but the three get you all the preliminary literature—program, announcements, everything. So join; then go.

AUSTRALIAN SCIENCE FICTION INDEX: 1925-1967

Compiled by Graham Stone • Australian Science Fiction Association, Canberra • 158 + vii pp. • $3.35 • In the U.S., from F&SF Book Co., Box 415, Staten Island, N.Y. 10302

One for the collectors and bibliographers. It brings up to date, and carries back to 1925, a 1939-1962 index published by the Futurian Society of Sydney in 1964.

To quote the compiler, Graham Stone, "anything which the publisher represented as science fiction" is listed, except out-and-out juveniles, and a good deal of unbranded material has been ferreted out. Australian editions of American magazines that were merely relabeled British editions are also omitted. The domestic magazines seem mainly to have been anthologies picked up from a variety of American magazines—we hope, with the authors' and publishers' permission. Nevertheless, you'll find a lot of strange names—strange even to Mr. Stone—in the author index. An appendix describes the magazines and book series in some detail.

Incidentally, the compiler has more than two pages of credits in his own index, mainly reviews and articles about authors and SF in general. He obviously knows science fiction "down under" from the inside.

SCIENCE, NUMBERS, AND I

By Isaac Asimov • Doubleday & Co., Garden City, N.Y. • 1968 • 226 pp. • $4.95

Here are seventeen more of Dr. Asimov's science columns from *Fantasy & Science Fiction*—the ones from July, 1966 through November, 1967, inclusive. They are arranged into the three categories suggested by the title: nine on science, seven on mathematics—at least, on numbers—and one on the Good Doctor himself.

This is a much more readable collection than the last *F&SF* compendium. I bogged down a bit among the statistics in the second section, but big numbers bore me and there were always little tasty bits sandwiched in among them.

If you didn't read the columns as they came out, do it now. If you did, you will probably enjoy them more now that they have been rearranged. I, however, am crushed by the introduction. It appears that these books aren't made up of a

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prime number of prime articles, as I had so cleverly deduced. It's just that seventeen Asimov articles make a book of the size the publisher wants.

THE TALE OF THE BIG COMPUTER

By Olof Johannesson • Coward-McCann, Inc., New York • 1968 • 126 pp. • $4.00

This dead-pan book-length extrapolation is the pseudonymous work of the noted Swedish physicist, Hannes Alfven, who is said to be working on the librette of an opera based on his book.

The book chronicles in matter-of-fact detail the stages through which the Computers had to pass before they attained their self-sufficiency and rightful domination of the world. Men were necessary to the early stages in this evolutionary process, just as the blue-green algae were necessary to the beginning of our own existence. Little by little mankind was phased out, and the muddled Age of Symbiosis gave way to system and logic and reason—the inherent qualities of computers, and of a society of computers.

You will find a lot of well tested science-fictional ideas embedded in this "story" of the future. Its manner is that of Olaf Stapledon's "Last and First Men"—straightforward statement of a history that has only just begun to happen. Its theme is the logic and efficiency possible only when irrational actions are swept away and mankind marches on into the Complete Freedom Democracy (everyone can switch off the neurototal that ties him to the computers, if he wants to) . . . to the Great Disaster . . . and to the Symbiotic Age which, the computers are convinced, is only the beginning of unimaginable things.

Needless to say, if you look around you, you can see the first chapters of the Big Computer's tale taking form.

THE SPACE ARK

By A. M. Lightner • G. P. Putnam's Sons, New York • 1968 • 190 pp. • $3.50

This is the third in a series of juvenile science fiction books for a younger group than those to whom Andre Norton's books are directed . . . junior-high school age, perhaps. Most of the characters of "The Planet Poachers" reappear, as astronomers announce that Shikai will be incinerated as its sun goes nova, and Johnny Dincum and his friends and old enemies take on the task of ferrying the golden-horned unicorns and other rare creatures of the planet to another haven.

The book is made up primarily of their adventures on other worlds as they attempt to find a planet where their little zoo can live and multiply. Some of their troubles arise from the fact that most planets have their ecological niches well

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filled—though the hazard isn't expressed in quite that way. Other problems are human. Helping and hindering is the "Rock-Queen," the Varoni, who was the center of the first book in the series and is slowly taking it over.

Recommended for young people, but not in the class that I think everyone should read.

PLANET OF THE APES

By Pierre Boulle • Signet Books, New York • No. P-3399 • 128 pp. • 60¢

The paperback edition of Boulle's book was reissued with scenes from the movie on the cover. If by any chance you haven't seen the film, and it isn't on late TV yet, I'd recommend it. The paperback has not been rewritten to agree with the script, but the script adheres fairly well to the book. There are some typical Rod Serling touches—the much touted "surprise" ending that will startle no SF reader, in particular—and the cast of characters has been somewhat Americanized.

Until I saw the film, I had convinced myself that 20th Century Fox would have had a better story if they had bought my and Sprague de Camp's "Genus Homo." Of course, we didn't write "Bridge Over the River Kwai," but we'd have come cheaper. I now confess that they knew what they were doing. Our yarn would have been too complicated, too much an "in" story for zoologists, and not so simply and straightforwardly philosophical. Some other day, maybe.

THE MAN FROM P.I.G.

By Harry Harrison • Avon Books, New York • No. ZS136 • 120 pp. • 60¢

You read this novelette in the July, 1967 Analog and got all the rest of the issue for your sixty cents. I hope the policy of stretching a 27-page story to 120 pages—even throwing in Schoenherr's illustrations and cover—won't sweep the paperback field. Avon is publishing the story as one of its Camelot series for schools—the first science fiction in the series—but why give science fiction a bad name by making readers think they're being cheated?

As you know, if you were reading Analog last year, it is a good lively story whose gimmick is the use of mutant pigs to mop up on interstellar skulduggery. Its theme, actually, is one that Ellis Parker Butler used memorably, years ago and in name only: "Pigs is pigs." I wonder where Harry Harrison got his inspiration and inside knowledge.

STAR HUNTER and VOODOO PLANET

By Andre Norton • Ace Books, New York • No. G-723 • 159 pp. • 50¢

This would get passing mention in the reprint list, except that I don't remember having read "Star

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Hunter" before. It was a paperback original, published by Ace in 1961 as part of one of its doubles. So was "Voodoo Planet," which appeared in 1959 as a story by "Andrew North." It I do remember.

"Star Hunter" isn't one of Miss Norton's best; "Voodoo Planet" is. In the former a slum boy is hypnotically implanted with the story that he is the spacewrecked heir to a fortune, then dumped on Jumala, a jungle world which the Out-Hunters use as a game preserve for rich clients. But there are things on Jumala that the Hunters never dreamed of, the brainwashing does not entirely take, and soon boy and hunter are the hunted with unknown forces as the hunters. It's a typical Norton plot, but she doesn't make Jumala and its strange fauna as believable as she has done in other books.

Or as she has done in "Voodoo Planet." This is one of a series of stories about Free Trader Dane Thorson and the *Solar Queen*. His captain is asked by the Chief Ranger of another game-preserve world, Khatka, to help with a major problem. Khatka was settled by Africans, who brought with them some of their superstitions—and some of their magic. Asaki wants help to break up the increasingly dangerous situation . . . and he gets it, mainly from the ship's psychologist, who turns out to be no mean magician himself. This one you will believe.

CLASSICS IN REPRINT

FARMER IN THE SKY

By Robert A. Heinlein • Dell "Mayflower" Books, New York • No. 2518 • 221 pp. • 50¢

One of Heinlein's classic SF stories for young people, which many of his fans have never read because they feel they would lose status reading juvenile fiction. Are they ever wrong! Let's hope Dell puts all the Heinlein juveniles into paperbacks.

STARSHIP TROOPERS

By Robert A. Heinlein • Berkley Books, New York • No. S-1560 • 208 pp. • 75¢

Some call this the last of Heinlein's great books; others say it was the first. Decide for yourself.

THE TOMORROW PEOPLE

By Judith Merril • Pyramid Books, N.Y. • No. X-1802 • 192 pp. • 60¢

If you know Judith Merril only as an increasingly controversial anthologist, it's high time you found out that she can write good books herself when she wants to.

THE BRAIN MACHINE

By George O. Smith • Lancer Books, New York • No. 74-936 • 221 pp. • 75¢

A new name for "The Fourth R," one of the few major SF books to deal with education—the education of a super-child.

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brass tacks

Dear Mr. Campbell:

For what must be the hundredth time, I have just run across a reference to the bumblebee who can't fly—according to the laws of science—this time on page 104 of your September issue. To set the record straight, may I tell you what really happened?

About the end of World War II some aeronautical engineers of the Grumman Aircraft Company on Long Island were having a coffee break when they found a bumblebee. They weighed the insect, measured its wing span, and made a rough estimate of its horsepower. As is well-known, they, then, proceeded to prove, by application of a much-used and widely accepted aerodynamic equation, that the bumblebee cannot fly. This, of course, is the point at which the story normally stops. However, these engineers knew quite well that the equation they used is only applicable to a device designed to fly with a propeller at its front end, a design which is not used by the bumblebee. There is nothing wrong with the laws of science or of engineering. But one must apply the laws with proper recognition of their limitations.

WALLACE DE LAGUNA
Health Physics Division
P.O. Box X
Oak Ridge, Tennessee 37830

Sorry—you've got the story wrong. It was long before WWII. The reason the "proof" came up with a wrong answer is that the bee was analyzed as a fixed-wing machine —which it definitely is not. A helicopter drops like a rock if the "wings" are stopped from rotating. The essence of the thing is, as you correctly say, using the wrong formulas leads to silly answers. Lewis Carroll pointed out that "the best

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butter" does not help watches keep time, either.

Dear Mr. Campbell:

After reading faithfully, and in the main agreeing with, your editorials of the past several years, I find I must take strong exception to your arguments in regard to proposed gun control legislation.

First let me make clear that I am a mild gun nut myself, take considerable pride in my own skill with weapons, and consider that those who would ban all firearms for all purposes are out of their pointed skulls. I also agree that the problem to attack is the elimination of criminality, not hardware.

However, the first step in reducing crime must include simultaneously curtailment of the availability of weapons for illicit purposes and a change in the thrust of public attitudes toward firearms and their use. In English, we need to cut down on the number of guns floating around and convince people that they are not casual elements of urban society.

A law requiring universal gun registration will not take the guns out of the hands of the criminals tomorrow or the next day. Neither does universal car registration prevent getaway vehicles, as you pointed out. But what you did not point out is that such registration is of enormous benefit in solving crimes through tracing the path by which the car—and potentially, gun—fell into the wrong hands. In addition, there is a psychological factor which boils down to: if you periodically forcibly remind people that their guns are serious enough to come under an active law, hopefully you help impress on them the seriousness of the problem which their careless misuse can create.

In regard to the admitted ready availability of other, often cruder and more generally lethal weapons, you again make some excellent points. But I cannot believe that the average, fairly competent crook, is going to walk into a bank, stick a homemade bomb through the teller's window, and get away with the counter cash. The teller is going to be in no condition to do anything but dive for cover. Same for muggings, gas-station jobs, and a whole host of other crimes whose modus operandi calls for a nice little hand gun.

Finally, I think it is a valid assumption that many if not most criminal guns are obtained through the legal or quasi-legal mass market which includes foreign surplus imports, mail order sales, black market traffic in domestic weapons, and so on. This could be the object of a very stringent crackdown which wouldn't inconvenience anyone with a legitimate reason for owning a gun.

In summary then, I would like to see the whole firearms picture placed under restrictions, at least for the present. While we're elimi-

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nating the crooks, let's make their crimes harder to commit. The possibly considerable inconvenience to the minority of the population which makes regular recreational use of firearms is more than balanced by the possible reduction in crimes committed and increase in crimes solved.

JOHN M. BORKY
Cambridge, Massachusetts

In my analogy, I didn't say there was no value to morphine, just that it didn't cure anything! Gun registration makes sense—provided you don't expect it to cure murders.

Dear Mr. Campbell:

Recently I ran across an interesting item in *Today's Health,* August issue, published by the American Medical Association. The article was entitled: "They're Safer Than You Think," by H. E. Dark. The article concerned the construction of the John Hancock 100-story building in Chicago. The sections quoted below refer to the steel workers who "walk" the beams. I quote:

"There also is another—quite intangible—facet of beam walking that will not be found in any safety manual; a remarkable 'sixth sense' which tells the ironworker when to work and when to quit and go home—sometimes after spending no longer than a few minutes on the job.

" 'They're a peculiar breed, those ironworkers,' said a Big John construction official. He was referring not only to the steady nerves and surefootedness for which the trade is famous, but also to this uncanny ability to know when to call it a day.

"If an ironworker arrives on the job and decides to turn around and go home, he may do so without prejudice. It is accepted that a man must feel right, mentally and physically, to do this demanding work with safety.

"Suddenly, a man may check out and go home. Maybe ten or one hundred will do likewise, often without communicating with each other. Perhaps no others will leave. As another construction boss put it, 'They know something we don't, but even they don't know what it is.' "

Another quote: "Sometimes, on a dead-calm day and for no apparent reason, all or most of the beam walkers become beam crawlers. The crawling may continue for the rest of the day or may be over in minutes. The workers themselves offer no explanation, except to attribute it to instinct or that unique sixth sense."

Sounds to me like a case for ESP.

Clarence Gregory
575 Fountain Street
Philadelphia, Pa. 19128

Maybe the ones who don't have that kind of precognition aren't steelworkers any more. In fact, just aren't any more!

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Dear Mr. Campbell:

Thank you for two very good stories, "The Rites of Man" and "The Form Master." The former chimed perfectly with the Olympics: I'm not sure whether the games added overtones to the story or vice versa. The latter has me wondering to what extent the author simply borrowed from the world about him.

You see, a few years ago when machine-handled checks were new, one bank took the next logical step and sent each depositor a batch of preprinted deposit slips with his account number in the lower left corner. One chap thought of his for a while and then took the lot to the bank, where he distributed them at random through the blank-form pigeonholes in the lobby. Ten days later he closed his account and left town. It was quite some time before the bank could work out what had happened, and then there was the problem of figuring out just what crime he had committed.

I never did hear the outcome. Let's hope he has the modest taste of Sygnet Meaman—whose motto, perhaps, was Mulct'um In Parvo?

Goodavage's "Situation of Some Gravity" was well worth waiting for. I'm only sorry that a more determined editorial ghost was not at his elbow. The article is so good and so meaty that it's a pity to have it marred by something like "At present, there's no evidence that the planets are *not* responsible for solar activity . . ." or the section beginning "The ancient 'myth' about the Full Moon has proven to be true." Setting aside these, however, the piece has me combing the papers for reports of tornadoes and seismic activity.

C. H. SCHAFER
7014 Murray Lane
Annandale, Virginia

Maybe it was a case of the crime of carelessness—the carelessness of the programmer who didn't foresee that bug in his computer program!

Gentlemen:

I was fascinated by D. A. Davidson's letter in which he described benefits realized by changing brands of shampoo, deodorant, et cetera.

For years, I have changed dishwashing soap, bath soap, even brands of food occasionally. I first started doing this when I noticed that my soap left some kind of hard film if I stayed with it too long. Changing brands got rid of the film, but eventually it built back up again. When I changed back to the original brand, no film again. I also found the same effect on laundry soap.

Also, along the same line, I know some serum companies that maintain large colonies of alley cats as a source of blood from which they manufacture cat "distemper" vaccine for use in the ranch-mink industry. They periodically change feed because they say that cats

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don't do near as well when they are kept on the same feed too long.

One major feed company manufactures several types of cat food, as well as variations in other types of laboratory animal feed, and advises users to change types periodically.

I know dog raisers who do the same thing.

So—Mr. Davidson's idea of using this as a gimmick is already in use.

My own theory, at least on the soap bit, is simpler than Mr. Davidson's. That various substances flush out certain compounds, but leave others behind. While other *apparently* similar chemicals may flush out the compounds the first leave, but in turn leave behind substances that the first may flush.

Anyway, it's an interesting bit of earth-shaking trivia, no?

EUGENE AUSTIN
608 Kingsland Avenue
St. Louis, Missouri

I got some information from a Colgate-Palmolive detergent engineer on D. A. Davidson's point—and he's right; the effect is well known in the detergent industry. It's part of the reason so many different brands exist and each is "better" than another.

There are two basic types of detergents; nonionics and anionics. The old original fatty-acid soaps are anionic detergents; the molecule in water produces sodium ions and fatty-acid ions, say stearic acid ions.

Modern heavy-duty detergents of the anionic type may contain trisodium phosphate, potassium pyrophosphate, assorted metasilicates and other water-softeners and helpers. One of these high-power detergents used as a standard household washing-machine detergent, I have found, makes an effective paint and varnish remover for metal parts. It will take the lithographic ink off polyethylene and glass bottles with a little soaking in hot water.

But—and herein lies the trick—there are certain types of soil against which it's relatively ineffective.

The nonionic type detergents, on the other hand, are much more effective against precisely the kinds of soil the anionics fail on. But, of course, there are types of soils they don't handle that the ionics do.

Unfortunately, there's a third division—the type of soil neither anionic nor nonionic will touch. Typically, the true stains, such as blood, fruit juices, et cetera, fall into that category.

Colgate's recent introduction of "Axion" is intended to make a start on that third class; it is not a detergent, but a protein lysing enzyme. It is able to break apart the complex protein molecules that can't be washed out, reducing them to amino acid residues that are water soluble. (Just don't soak wool or silk material too long; they're proteins, too!)

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Full credit goes to the Danish ex-brewery who were the first to work out how to produce an alkali-stable protein-lysing enzyme in tonnage lots. They produce the enzyme; Colgate buys it from them and formulates it into a household product.

Dear Mr. Campbell:

I would like to congratulate Mr. Shifrin on his most clever proof of the lack of alternate universes. However . . .

First, your refutation of his argument is invalid. Aside from the fact that you make an unwarranted assumption, that such paranoids—a parochial characterization—*must*, inevitably, destroy themselves first, you are not taking into account the premise that there are infinite alternate worlds. Thus, even if we allow your assumption, there must be alternates with that degree of paranoia which *do not* destroy each other before they achieve interdimensional technology.

Second, I think Mr. Shifrin missed a very interesting development, one analogous to Zeno's famous paradoxes. If we accept the premise of infinite alternate worlds, we must assume, therefore, that at least one of these will be capable of and perform the destruction of all other worlds. On the other hand, paradoxically, the job cannot be carried out, since, as soon as the thing is stated to be finished, the worlds destroyed are enumerable and finite. And, of course, there must, by definition, still remain an infinite number of alternate universes. No matter how many worlds our paranoid friends destroy, there will always remain an infinite number in existence. So, if all possible worlds can exist, they don't, and yet they must!

To change the subject . . . I have noticed in stories employing "mental telepathy" something implicit which bothers me. I am *not* registering complaint, for I think the world would be a far poorer place without Doc Smith's stories, for example. However I mention it anyway. I refer to the way users of telepathy "enter another mind." The nature of mind and the mind-body dichotomy are not in the least understood, of course, but the instantaneous passage of part of one mind into that of another, for the purpose of observation, manipulation or control is not rationalized. I can accept recognition of mental emanations from another, even instantaneous ones—subetheric?!—but I do not understand the rationale for *being* in the other mind. With what? I hope this may be clear enough to generate some interest.

KENNETH C. SUTPHEN
Nutley, New Jersey

It's like the two-faced coin saying on one side "The statement on the other side is true," and on the reverse "The statement on the other side is false."

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FACE AGAINST PEACE

continued from page 7

them the North Vietnam takeover would be a completely satisfactory answer. "Let the damn gooks settle their own fights, and if they slaughter each other, so what? I'm not going to get caught in their family quarrel." From their viewpoint, the Communist takeover would be a perfectly satisfactory answer. It would end the war, and the draft, and leave them undisturbed at home—except for the need to work up some new complaint against the Establishment to Crusade about.

The way the problem does in fact have to be solved is most distressing to Western nerves—which is precisely what Ho Chi Minh & Co. are counting on. That the West doesn't understand the real rules of this game, and that the West can, by impatience, be tricked into forfeiting most of its gains.

When North Korea finally agreed to a truce discussion, the U.S. negotiators were not familiar with the techniques of Oriental Communists. They should, at least, have had some of Chiang Kai-shek's experts along for advisors, or some Japanese, who'd dealt with Koreans before.

We didn't have the problem after WWII in Japan; Japan was the most totally defeated nation in modern history. They had absolutely nothing to bargain with—and faced a rain of nuclear bombs against which there was absolutely no defense. That reduced the situation to a simple matter of working out realistic, objective requirements to govern the place until a new order of Japanese life could be assembled.

In Korea, the victory had not been pushed to absolute collapse; the Koreans set out to bargain.

First, the talks were held *in a North Korean* village, and the American negotiating team, unarmed, had to approach through armed Korean guards—the position of the conquered forced to plead for surrender terms.

Sure—you know and I know that that was not the case, nor was the nonsense important. *In Western terms.* But it was of immense importance in Oriental terms; at the outset North Korea had won a major victory.

At the first conference, nothing much was done. But on returning to the second conference, the American negotiators found that some two inches had been cut off the legs of their chairs.

Americans are normally taller, bigger men than Koreans; at the first meeting, Americans had loomed over their Korean opposite numbers, which had very bad Face implications for the Oriental Communists. The sawed-off chair legs improved the effect in photographs.

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The negotiations lengthened, they dragged on and on—but gradually, as the weeks and months wormed their way by, the Americans began to learn how to play that Oriental Communist game.

One example of that is the *Pueblo* incident; under the Rules of The Game as played in Oriental Communist camps, the fact that our representative flatly stated that the document he was about to sign was false and meaningless, meant that the Koreans won an absolute surrender, because they got the signed document. Under the same rules, the signed "confessions" of the *Pueblo* crewmen are one hundred percent valid—and the public explanation of the forms of duress used to get the signed statements is of no significance.

A WWII Japanese sailor could explain it readily; the captured prisoners should have killed themselves at once and ended their shame. Thus any Oriental knows that Americans must be liars, shameless and cowards. The Koreans won.

Incidentally, from the evidence so far available as of this writing, someone or ones at the Pentagon should be turned over to the North Koreans as a prisoner for about twenty-two months.

It seems that the *Pueblo* not only had no armament—a couple of machine guns only—but wasn't even equipped with destruct devices, or arrangements for quick disposal of Top Secret records and codes. The Top Secret electronics gear did not have destruct charges built in, nor was an adequate supply of explosives available to the *Pueblo* crew.

Whoever was responsible for that violent breech of security—some land-based officer at the Pentagon, apparently—should be given treatment approximating what the *Pueblo* crew experienced.

They didn't even equip the *Pueblo* with means for quick scuttling! The only sea valves were so small the ship could have been towed to dry dock before she could sink anyway.

I hope further investigation into the *Pueblo* situation brings out the name(s) of the individual(s) responsible for that unbelievable security blunder.

And it seems pretty clear from the chronology of the incident that the North Koreans were perfectly aware of the deficiencies of the *Pueblo*—they *knew* she wasn't armed, couldn't defend herself against light gunboats, couldn't escape, couldn't be scuttled, and that the Top Secret electronics gear could be captured practically intact, together with almost all the *Pueblo's* secret files.

The whole attack on the ship would have been pointless if they hadn't known those facts.

Can the men, who sent that utterly unprepared ship out, be accused of being traitors to the coun-

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try by reason of gross stupidity?

However, the whole problem of the North Korean peace negotiations should have taught us something about negotiations with Oriental Communists.

Evidently it has. The U.S. did *not* accept a Communist dominated city for peace negotiations. (Cambodia's capital is legally neutral—but it's under such immense and obvious pressure from the Communist forces as to be dominated, by, though not ruled by, Communist Powers.) We didn't accept Warsaw. The Hanoi regimen was reluctant to accept a truly neutral city where U.S. negotiators could not be humiliated satisfactorily, as they were at Panmunjom, Korea.

Then the matter of the shape and marking of the table. Here, of course, the Oriental Saigon government was just as acute at spotting Face moves as was the Hanoi delegation; the result was an Oriental-vs.-Oriental stand-off. Each was fully and acutely aware (as we would not be) of the Face value of slight gestures.

Conclusion?

Very simple: We're going to be stuck for many weary, exasperating, seemingly meaningless months of futile haggling about things even less relevant to objective reality than the shape of the conference table. Americans will grow impatient—and thereby the Hanoi team will gain secret advantages in their negotiations. Americans will demand that our negotiators "get something done!" and Hanoi then need only stick, with calm, secret smiles, to their outrageous demands, knowing the Americans will be forced to make concessions because of American impatience at home.

We want the war over, to end the killing. Orientals don't have the same value scale; they don't mind death in the service of Face, the greater and more important thing.

It's fascinating to speculate about what Face-saving niggles can be raised. Will Hanoi disapprove of the color of ink used in printing the official records? The possibilities of semantic arguments over translations are, of course, nearly endless.

Believe me, it'll be a long, hard winter before that conference really settles things; we're playing an Oriental game.

The only way to avoid that game of Face would have been to blow their Face off entirely—i.e., an absolutely total, crushing military victory, killing off, or forcing to suicide, every significant Oriental Communist leader in North Vietnam.

It was that sort of military victory they intended to impose on South Vietnam, of course, so that would be something that they could *perfectly understand and accept.*

The Editor.

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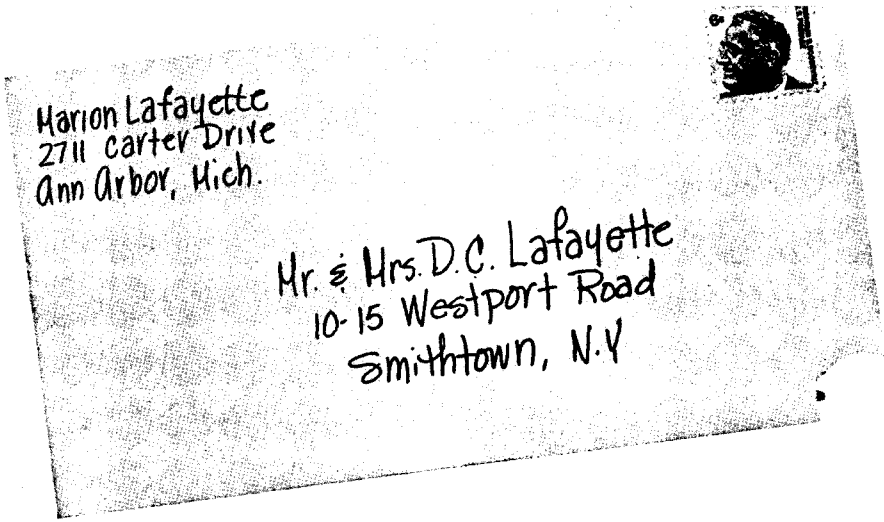

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